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EXTRACTS FROM THE INVALUABLE WORK OF SIR HUMPHRY DAVY, ENTITLED "ELEMENTS OF AGRICULTURAL CHEMISTRY."

I HAVE extracted the following pages from the sixth Lecture of Sir H. Davy, on the "Elements of Agricultural Chemistry," which treats principally of manures of vegetable and animal origin. As there are many facts therein contained, not much known, and opinions not generally received in this country, particularly respecting the use of green vegetables and animal matter before any fermentation has taken place, I have considered the subject of sufficient importance to communicate them to the Trustees of the Massachusetts Society for Promoting Agriculture to publish if they think proper. With respect,

AARON DEXTER.

THAT certain vegetable and animal substances introduced into the soil accelerate vegetation and increase the produce of crops, is a fact known since the earliest period of agriculture; but the manner in which manures act, the best modes of applying them, their relative value and durability, are still subjects of discussion

The pores in the fibres of the roots of plants are so small, that it is with difficulty they can be discovered by the microscope; it is not therefore probable, that solid substances can pass into them from the soil.

No substance is more necessary to plants than carbonaceous matter; and if this cannot be introduced into the organs of

plants except in a state of solution, there is every reason to suppose that other substances less essential will be in the same case.

I endeavoured to ascertain whether soluble vegetable substances passed in an unchanged state into the roots of plants by comparing the products of the analysis of the roots of some plants of mint which had grown, some in common water, some in a solution of sugar. One hundred and twenty grains of the roots of the mint which grew in the solution of sugar afforded five grains of pale green extract which had a sweetish taste, but which slightly coagulated by the action of alcohol. One hundred and twenty grains of the roots of the mint which had grown in common water yielded three grains and an half of extract, which was of a deep olive colour; its taste was sweetish, but more astringent than that of the other extract, and it coagulated more freely with alcohol.

Vegetable and animal substances, as is shewn by universal experience, are consumed in vegetation, and they can only nourish the plant by affording solid matters capable of being dissolved by water, or gaseous substances capable of being absorbed by the fluids in the leaves of vegetables; but such parts of them as are rendered gaseous, and that pass into the atmosphere, must produce a comparatively small effect, for gasses soon become diffused through the mass of the surrounding air.

The great object in the application of manure should be to make it afford as much soluble matter as possible to the roots of the plants; and that in a slow and gradual manner, so that it may be entirely consumed in forming the sap or organized parts of the plants.

Mucilaginous, gelatinous, saccharine, oily, and extractive fluids, and solution of corbonic acid in water, are substances that in their unchanged states contain almost all the principles necessary for the life of plants; but there are few cases in which they can be applied as manures in their pure forms: and vegetable manures, in general, contain a great excess of fibrous and insoluble matter, which must undergo chemical changes before they can become the food of plants.

The ammonia given off from animal compounds in putrefaction may be conceived to be formed at the time of their decomposition by the combination of hydrogene and azote; except

this matter, the other products of putrefaction are analogous to those afforded by the fermentation of vegetable substances; and the soluble substances formed, abound in the elements, which are the constituent parts of vegetables—in carbon, hydrogene and oxygene.

Whenever manures consist principally of matter soluble in water, it is evident that their fermentation or putrefaction should be prevented as much as possible; and the only cases in which these processes can be useful, are when the manure consists principally of vegetable or animal fibre.

The circumstances necessary for the putrefaction of animal substances are similar to those required for the fermentation of vegetable substances; a temperature above the freezing point, the presence of water, and the presence of oxygene, at least in the first stage of the process. To prevent manures from decomposing, they should be preserved dry, defended from the contact of air, and kept as cool as possible.

Salt and *alcohol* appear to owe their powers of preserving animal and vegetable substances to their attraction for water, by which they prevent its decomposing action, and likewise to their excluding air. The use of ice in preserving animal substances is owing to its keeping their temperature low. The efficacy of M. Appert's method of preserving animal and vegetable substances, an account of which has been lately published, entirely depends upon the exclusion of air. This method is by filling a vessel of tin plate or glass with the meat or vegetables; soldering or cementing the top, so as to render the vessel air tight; and then keeping it half immersed in a vessel of boiling water for a sufficient time to render the meat or vegetables proper for food.

As different manures contain different proportions of the elements necessary to vegetation, so they require a different treatment to enable them to produce their full effects in agriculture.

All *green succulent plants* contain saccharine or mucilaginous matter, with woody fibre, and readily ferment. They cannot therefore if intended for manure, be used too soon after their death.

When *green crops* are to be employed for enriching a soil, they should be ploughed in, if it be possible, when in flower, or at the time the flower is beginning to appear: for it is at this period

that they contain the largest quantity of easily soluble matter, and that their leaves are most active in forming nutritive matter. Green crops, pond weeds, the paring of hedges or ditches, or any kind of fresh vegetable matter, require no preparation to fit them for manure. The decomposition slowly proceeds beneath the soil; the soluble matters are gradually dissolved, and the slight fermentation that goes on checked by the want of a free communication of air, tends to render the woody fibre soluble without occasioning the rapid dissipation of elastic matters.

When old pastures are broken up and made arable, not only has the soil been enriched by the death and slow decay of the plants which have left soluble matters in the soil; but the leaves and roots of the grasses living at the time and occupying so large a part of the surface, afford saccharine, mucilaginous, and extractive matters, which become immediately the food of the crop, and the gradual decomposition affords a supply for successive years.

Sea weeds consisting of different species of fuci, algœ and confervœ are much used as a manure on the coasts of Britain and Ireland. By digesting the common fucus, which is the sea-weed usually most abundant on the sea coast, in boiling water, I obtained from it one eighth of a gelatinous substance which had characters similar to mucilage. A quantity distilled gave nearly four fifths of its weight of water, but no ammonia; the water had an empyreumatic and slightly sour taste; the ashes contained sea salt, carbonate of soda, and carbonaceous matter. The gaseous matter afforded was small in quantity, principally carbonic acid and gaseous oxide of carbon, with a little hydrocarbonate. This manure is transient in its effects, and does not last for more than a single crop, which is easily accounted for from the large quantity of water, or the elements of water it contains. It decays without producing heat when exposed to the atmosphere, and seems as it were to melt down and dissolve away. I have seen a large heap entirely destroyed in less than two years, nothing remaining but a little black fibrous matter.

Sea weed is sometimes suffered to ferment before it is used; but this process seems wholly unnecessary, for there is no fibrous matter rendered soluble in the process, and a part of the manure is lost.

Dry straw of wheat, oats, barley, beans and peas, and spoiled hay, or any other similar kind of dry vegetable matter, is in

all cases, useful manure. In general such substances are made to ferment before they are employed, though it may be doubted whether the practice should indiscriminately be adopted.

When straw is made to ferment it becomes a more manageable manure; but there is likewise on the whole a great loss of nutritive matter. More manure is perhaps supplied for a single crop; but the land is less improved than it would be, supposing the whole of the vegetable matter could be finely divided and mixed with the soil.

It is usual to carry straw that can be employed for no other purpose to the dunghill, to ferment and decompose; but it is worth experiment, whether it may not be more economically applied when chopped small by a proper machine and kept dry till it is ploughed in for the use of a crop. In this case, though it would decompose much more slowly and produce less effect at first, yet its influence would be much more lasting.

Wood-ashes imperfectly formed, that is wood ashes containing much charcoal, are said to have been used with success as a manure. A part of their effects may be owing to the slow and gradual consumption of the charcoal, which seems capable, under other circumstances than those of actual combustion, of absorbing oxygene so as to become carbonic acid.

Manures from animal substances in general require no chemical preparations to fit them for the soil. The great object of the farmer is to blend them with earthy constituents in a proper state of division and to prevent their too rapid decomposition.

The entire parts of the muscles of land animals are not commonly used as a manure though there are many cases in which such an application might be easily made. Horses, Dogs, Sheep, Deer and other quadrupeds that have died accidentally, or of disease, after their skins are separated, are often suffered to remain exposed to the air or immersed in water till they are destroyed by birds or beasts of prey, or entirely decomposed; and in this case most of their organized matter is lost for the land on which they lie, and a considerable portion of it employed in giving off noxious gasses to the atmosphere.

By covering dead animals with five or six times their bulk of soil, mixed with one part of lime, and suffering them to remain for a few months, their decomposition would impregnate the soil with soluble matters so as to render it an excellent manure;

and by mixing a little fresh quick lime with it at the time of its removal, the disagreeable effluvia would be in a great measure destroyed; and it might be applied in the same way as any other manure to crops.

Fish forms a powerful manure in whatever state it is applied; but it cannot be ploughed in too fresh, though the quantity be limited. Mr. Young records an experiment, in which herrings spread over a field and ploughed in for wheat produced so rank a crop, that it was entirely laid before harvest.

It is easy to explain the operations of fish as a manure. The skin is principally gelatine; which from its slight state of cohesion is readily soluble in water,fat or oil; is always found in fishes, either under the skin or in some of the viscera; and their fibrous matter contains all the essential elements of vegetable substances.

Among oily substances, *graves* and *blubber* are employed as manure. They are both most useful when mixed with soil, so as to expose a large surface to the air, the oxygene of which produces soluble matter from them. Lord Somerville used blubber with great success at his farm in Surrey. It was made into a heap with soil, and retained its powers of fertilizing for several successive years.

The carbon and hydrogene abounding in oily substances fully account for their effects; and their durability is easily explained from the gradual manner in which they change by the action of air and water.

Bones are much used as a manure in the neighbourhood of London. After being broken and boiled for grease, they are sold to the farmer. The more divided they are the more powerful are their effects. The expense of grinding them in a mill would probably be repaid by the increase of their fertilizing powers; and in the state of powder, they might be used in the drill husbandry.

Bone dust and *bone shavings*, *the refuse of the turning manufacture*, may be advantageously employed in the same way.

The basis of bone is constituted by earthy salts, principally phosphate of lime, with some carbonate of lime, and phosphate of magnesia; the easily decomposable substances in bone are fat, gelatine, and cartilage, which seem of the same nature as coagulated albumen.

Hair, *woollen rags* and *feathers* are all analogous in composition, and principally consist of a substance similar to albumen, united to gelatine. This is shewn by the ingenious researches of Mr. Hatchet. The theory of their operation is similar to that of bone and horn shavings.

The *refuse* of the different manufactures of skin and leather form very useful manure; such as the shavings of the currier, furrier's clippings, and the offals of the tan-yard and of the glue-maker. The gelatine contained in every kind of skin is in a state for its gradual solution or decomposition; and when buried in the soil, it lasts for a considerable time, and constantly affords a supply of nutritive matter to the plants in its neighbourhood.

Blood contains certain quantities of all the principles found in other animal substances, and is consequently a very good manure.

Among *excrementatious* animal substances used as manures, *urine* is the one upon which the greatest number of chemical experiments have been made, and the nature of which is best understood.

Urine is very liable to change and to undergo the putrefactive process; and that of carnivorous animals, more rapidly than that of graminivorous animals. In proportion as there is more gelatine and albumen in urine, so in proportion does it putrify more quickly.

The species of urine that contain most albumen, gelatine and urea, are the best manures; and all urine contains the essential elements of vegetables in a state of solution.

During the putrefaction of urine the greatest part of the soluble animal matter that it contains is destroyed; it should consequently be used as fresh as possible; but if not mixed with solid matter it should be diluted with water, as when pure it contains too large a quantity of animal matter to form a proper fluid nourishment for absorption by the roots of plants.

Putrid urine abounds in ammoniacal salts; and though less active than fresh urine is a very powerful manure.

Amongst excrementatious solid substances used as manures, one of the most powerful is the *dung of birds* that feed on animal food, particularly the dung of sea birds. It is easy to explain its fertilizing properties; from its composition it might be supposed to be a very powerful manure. It requires water for the

solution of its soluble matter to enable it to produce its full beneficial effect on crops.

Night soil, it is well known, is a very powerful manure, and very liable to decompose. It differs in its composition; but always abounds in substances composed of carbon, hydrogene, azote, and oxygene. From the analysis of Berzelius, it appears that a part of it is always soluble in water; and in whatever state it is used, whether recent or fermented, it supplies abundance of food to plants.

The disagreeable smell of night soil may be destroyed by mixing it with quick lime; and if exposed to the atmosphere, in thin layers strewed over with quick lime, in fine weather it speedily dries, is easily pulverized, and in this state may be used.

The Chinese, who have more practical knowledge of the use and application of manures than any other people existing, mix their night soil with one third of its weight of a fat marle, make it into cakes, and dry it by exposure to the sun. These cakes, we are informed by the French missionaries, have no disagreeable smell, and form a common article of commerce of the empire.

The earth by its absorbent powers probably prevents to a certain extent, the action of moisture upon the dung, and likewise defends it from the effects of air.

After night soil, *pigeons' dung* comes next in order, as to fertilizing power. It is evident that this manure should be applied as new as possible, and when dry it may be employed in the same manner as the other manures, capable of being pulverized.

The dung of *domestic fowls* approaches very nearly in its nature to pigeons' dung.

The dung of *cattle*, *oxen* and *cows* has been chemically examined by M. M. Einhof and Thaer. They found that it contained matter soluble in water, and that it gave in fermentation nearly the same products as vegetable substances, absorbing oxygene and producing carbonic acid gas.

If the pure dung of cattle is to be used as manure like the other species of dung which have been mentioned, there seems no reason, why it should be made to ferment except in the soil; or if suffered to ferment it should be only in a very slight degree. The grass in the neighbourhood of recently voided dung is always coarse and dark green. Some persons have attributed

this to a noxious quality in unfermented dung; but it seems to be rather the result of an excess of food furnished to the plants.

The question of the proper mode of the application of the dung of horses and cattle, however, properly belongs to the subject of *composite manures*, for it is usually mixed in the farm yard with straw, offal, chaff, and various kinds of litter; and itself contains a large propotion of fibrous vegetable matter.

A slight incipient fermentation is undoubtedly of use in the dunghill; for by means of it a disposition is brought on in the woody fibre to decay and dissolve when it is carried to the land, or ploughed into the soil; and woody fibre is always in great excess in the refuse of the farm.

Too great a degree of fermentation is however, very prejudicial to the composite manure in the dung-hill; it is better that there should be no fermentation at all before the manure is used than that it should be carried too far. The excess of fermentation tends to the destruction and dissipation of the most useful part of the manure; and the ultimate results of this process are like those of combustion. It is a common practice among farmers to suffer the farm-yard dung to ferment till the fibrous texture of the vegetable matter is entirely broken down; and till the manure becomes perfectly cold, and so soft as to be cut easily with the spade. Independent of the general theoretical views unfavourable to this practice, founded upon the nature and composition of vegetable substances, there are many arguments and facts which shew it is prejudicial to the interests of the farmer.

During the violent fermentation which is necessary for reducing farm yard manure to the state in which it is called *short muck*, not only a large quantity of fluid but also of a gaseous matter is lost, so much so that the dung is reduced one half or two thirds in weight; and the principal elastic matter disengaged is carbonic acid with some ammonia; and both these if retained by the moisture in the soil are capable of becoming an useful nourishment of plants. Besides the dissipation of gaseous matter, when fermentation is pushed to the extreme, there is another disadvantage in the loss of heat, which if excited in the soil is useful in promoting the germination of the seed, and in assisting the plant in the first stage of its growth, when it is most feeble and liable to disease; and the fermentation of manure in the soil must be particularly favoura-

ble to the wheat crop in preserving a genial temperature beneath the surface late in autumn and during winter.

Again it is a general principle in Chemistry, that in all cases of decomposition, substances combine much more readily at the moment of their disengagement, than after they have been perfectly formed. And in fermentation beneath the soil the fluid matter produced is applied instantly, even while it is warm, to the organs of the plant, and consequently is more likely to be efficient than in manure that has gone through the process, and of which all the principles have entered into new combinations.

A great objection against slightly fermented dung, is that weeds spring up more luxuriantly where it is applied. If there are seeds carried out in the dung they will certainly germinate; but it is seldom that this can be the case to any extent; if the land is not cleansed of weeds, any kind of manure fermented or unfermented will occasion their rapid growth. If slightly fermented farm-yard dung is used as a top dressing for pastures, the long straws and unfermented vegetable matter remaining on the surface, should be removed as soon as the grass begins to rise vigorously, by raking, and carried back to the dung hill: in this case no manure will be lost, and the husbandry will be at once clean and economical.

In cases when farm-yard dung cannot be immediately applied to crops, the destructive fermentation of it should be prevented as much as possible. The principles on which this may be effected have been alluded to.

Watering dunghills is sometimes recommended for checking the progress of fermentation; but this practice is inconsistent with just chemical views. It may cool the dung for a short time, but moisture is a principal agent in all processes of decomposition. Dry fibrous matter will never ferment. Water is as necessary as air to the process; and to supply it to fermenting dung, is to supply an agent which will hasten its decay.

In all cases when dung is fermenting there are simple tests by which the rapidity of the process and consequently the injury done may be discovered.

If a thermometer plunged into the dung does not rise to above 100 degrees of Fahrenheit, there is little danger of much æriform matter flying off. If the temperature is higher, the dung should be immediately spread abroad.

When dung is to be preserved for any time, the situation in which it is kept is of importance. It should if possible be defended from the sun. To preserve it under sheds would be of great use; or to make the size of a dung hill on the north side of a wall. The floor on which the dung is heaped, should if possible be paved with flat stones; and there should be a little inclination from each side towards the centre, in which there should be drains, connected with a small well furnished with a pump, by which any fluid matter may be collected for the use of the land. It too often happens that a dense mucilaginous and extractive fluid is suffered to drain away from the dunghill so as to be entirely lost to the farm.

Street and *road dung* and the *sweepings of houses* may be all regarded as composite manures; the constitution of them is necessarily various, as they are derived from a number of different substances. These manures are usually applied in a proper manner, without being fermented.

Soot,* principally formed from the combustion of pit coal, coal, generally contains substances derived from animal matters. This is a very powerful manure. It affords ammoniacal salts by distillation, and yields a brown extract to hot water of a bitter taste. It likewise contains an empyreumatic oil. Its great basis is charcoal in a state in which it is capable of being rendered soluble by the action of oxygene and water.

This manure is well fitted to be used in the dry state, thrown into the ground with the seed, and requires no preparation.

The doctrine of the proper application of manures from organized substances offers an illustration of an important part of the economy of nature, and of the happy order in which it is arranged.

The death and decay of animal substances tend to resolve organized forms into chemical constituents; and the pernicious effluvia disengaged in the process seems to point out the propriety of burying them in the soil, where they are fitted to become the food of vegetables. The fermentation and putrefaction of organized substances in the free atmosphere are noxious processes; beneath the surface of the ground they are salutary operations. In this case the food of plants is prepared where it

* In England.

can be used; and that which would offend the senses and injure the health, if exposed, is converted by gradual processes into forms of beauty and usefulness; the fœtid gas is rendered a constituent of the aroma of the flower, and what might be poison, becomes nourishment to animals and to man.

ON SOILING.

IN A LETTER FROM THE HON. JOSIAH QUINCY TO THE CORRESPONDING SECRETARY.

Boston, 27th December, 1815.

SIR,

A WRITER, in the last number of the Massachusetts Agricultural Repository, (page 318) having invited the attention of our farmers to the subject of "the relative advantages of feeding cattle in the stable or farm yard, or sending them to pastures," I have thought it would have a tendency to attract still further attention to this practice, were I to state that all my milch cows have now for two years past been kept wholly in the mode by that writer suggested;—that is they have been, as it is technically called *soiled*. During the whole of that time they have never been allowed to run upon any pasture, but have been fed on green food, cut and carried to them in the stable or barn yard. I have thus kept during that period seven or eight cows, and I can thus far unequivocally express my conviction of the economy of the system. I am so entirely satisfied not only of the practicability, but of the advantage of it, that unless future experiment shall differ from the past, I shall never allow cattle of any kind to pasture upon my farm; and I am preparing to apply a modified system of soiling also to the keeping of Sheep. A practice of this kind cannot of course be advisable to that class of farmers, which unquestionably constitute the greater number in Massachusetts, whose farms contain tracts of land suitable for nothing else than pasturage, but to that class, whose farms are small, and who are stimulated by that correct ambition of possessing a little land highly cultivated, rather than a great deal miserably managed; to that class, also, whose entire farms are capable of being tilled

or mown, particularly where their situation does not place them within any easy access to manures, the practice above proposed presents advantages of the most decided and unequivocal character.

My own experiments on this subject have been hitherto conducted upon a scale, which does not permit me to state any precise calculations on which my opinion of its advantages might be estimated. I am however perfectly satisfied of the following points :

1. That cattle may be kept and fattened equally well, and that they give as much milk, in this mode, if well conducted, as by any pasturage. Of this I am certain. Were I to express the full strength of my conviction, I should say they keep better, they fatten better, give more milk, and are far less liable to accidents of any kind.

2. That twice, at least, the same number of cattle may be kept, and better kept, upon the product of the same extent of land in this mode than could be if in pastures.

3. That the manner and the economy in land is an ample compensation, to say the least, for the labour.

All these and more advantages resulting from this practice are illustrated and enforced by very many European writers on agriculture. And I should not think of communicating any thing on the subject of this small experiment, were it not, that experiment and success in our country naturally strike the minds of practical men, with more force, and are likely to give more encouragement to other trials, than is possible to result from what is written in foreign countries.

The subject is well worthy the experiment of such farmers as I have above alluded to.

Whoever undertakes this practice should remember that preparation should be made of a regular succession of succulent crops, when the grass and clover begin to fail. Experiment upon this point is greatly to be desired so as to show what is best suited to our climate, and what species of food best intervenes between the early and later succulent crops of our farms. This period I have supplied by Indian corn, sown broadcast or in drill, cutting it when the tassels begin to shoot, and giving it green daily. This with the suckers, and tops taken from my Indian corn intended for harvest, with occasional aid from carrot and

turnip tops at harvesting, have been sufficient for the purpose of my experiment. But before attempting this practice on any considerable scale, a greater knowledge of the vegetable food best suited for a succession of summer crops is desirable. And if any practical farmer has made any experiments upon the subject, he would undoubtedly render a service to our agriculture by communicating them.

[We have extracted the following additional information on this subject from an English Journal. The reputation of the writer, (T. C. Curwan, Esq.) entitles it to all the weight a single experiment ought ever to have. It will moreover be found to accord with the statements of Mr. Quincy in favor of this system of feeding, and the prevailing opinion, we believe, in England.]

THE Society instituted for the encouragement of Arts, Manufactures and Commerce, having approved and sanctioned the system of soiling, I trust it may be satisfactory to them to receive a further proof of its utility than has hitherto been brought before the public. I am not acquainted with any experiments made to ascertain the practicability of rearing stock in the house. If such exist, they are without my knowledge.

I have to state to the society that my heifer was calved the 5th February 1812, and was reared in the house.

For the first five weeks it had a gallon of new milk daily. From that time to the middle of May two gallons, and from thence to the 16th June one gallon, and hay tea. It had grass and clover to the middle of October, and from thence to midsummer last was fed with turnips, mangel wurtzel, and wheat straw: during the remainder of the summer and autumn with refuse grass, and from October to the time it was killed in March last, it was fed with turnips and wheat-straw. As my purpose was to breed from it, every means was taken to check its progress to fatten; finding this could not be done, it was thought adviseable to slaughter it on the 15th March last. The following is the statement of its weight:—

When taken from food it weighed 72 stones, of 14lb. each. After fasting 48 hours, it weighed 68 stone.

Blood weighed - - -	2 stone	7 pounds,	
Bag, - - - - - -	9	3	
Hide, - - - - -	4		
Feet, - - - - -	1	2	
Puddings, - - - -	3	12	
Head and Heart, - - -	2	8	
Tallow, - - - -	6	6	
Carcass, - - - - -	38	4	
Total	68	0 or 952lb.	

Sale.

Carcass at 9*s* per stone, -	£17	4	6	
Tallow, - - - - - -	3	4	0	
Hide, - - - - - -	1	7	0	
Sundries, - - - -	0	5	0	
	£22	0	6	$97,77

Expense.

Value when dropped, - -	£2	2	0	
Feeding, - - - -	12	18	6	
Gain, $31 11 cents, or	7	0	0	
	£22	0	6	$97,77

The manure should more than compensate for the labour. If the object had been to feed it, a greater weight might have been obtained at little or no more expense. The colour of the meat was beautiful, and the grain and flavour could not be surpassed. As this is the first instance of beef being produced in so short a time, it has occasioned a good deal of speculation.

The heifer was of the short-horned breed. The success of this experiment has determined me to try it on a pretty extensive scale; if cattle can be stall-fed from their birth, and slaughtered at two years old, the farmer and the public will both be benefitted.

I am very sanguine in the success of my experiment in rearing cattle. I have thirteen calves, and expect two more that shall be reared on the soiling system.

[*Repertory of Arts, October*, 1815.]

FIELD CULTURE OF CARROTS.

[From the Same.]

Boston, 10*th December*, 1815.

SIR,

In compliance with the wishes of the board, I communicate some statements relative to the subjects, suggested at its last meeting.

The field culture of Carrots, for the purpose of providing a succulent food for winter's stock, begins to be, very deservedly, more and more an object of attention. I have had experience of several modes. But that which beyond all others I prefer, is the one, for which I am indebted to our associate, Samuel Wyllys Pomeroy, Esq. I regret that his engagements have not permitted him to make a communication upon the subject. But as I have been several times called upon to transcribe my mode of proceeding, I am confident that I shall have his consent when I transmit an extract of a letter, which he wrote to me in December 1811 upon this subject, and which contains the principle suggestions I have to make upon it.

"I will state my general practice in cultivating carrots. Plough as deep in the fall or spring as the state of the land will permit. Cross plough in the spring and harrow level. Put on fifteen, twenty or twenty-five buckloads of the most rotten compost to the acre, as the heart of the land may be. Spread and harrow it fine. Then with a horse-plough strike it into two-bout ridges, as near together as four back furrows will make them, and if the two first back furrows are narrow the other two being deep, the ridge will be nearly to a point, and should be eighteen or twenty-four inches from the bottom of the furrow if it be well cleared out. To do which make another bout in the furrow, if necessary. Then with the head of a rake strike off the crown of the ridge, till it is three or four inches wide, and with it, or a hoe, open a drill in the usual manner. Sow the seed pretty thick. Cover and press down a little with a hoe or shovel. When the weeds appear, run a small plough through the furrows. Hand-weed the crop, and hoe the weeds from the sides of the ridge. The orange carrot is the best."

In harvesting, a plough with one yoke of oxen should be run as near the side of the range of carrots, and as deep as possible. This loosens the dirt and clears one side of the carrots almost entirely from the earth. The labourers then with great facility take them by their tops out of the beds, and throw them into carts, with only an occasional use of the hoe to plants which the plough has not loosened. For field culture of carrots, I think there can be no question that this mode is of all the most preferable. Perhaps by cultivation in beds, a greater quantity may be raised on the same extent of ground, than is possible in this mode. This however, I think is doubtful, considering the size to which they grow when the plants are set at proper distances, (which ought to be three or four inches at least). The great advantage of this mode is in the economy of labour. I raised the last year, about eight hundred bushels on two acres of land, notwithstanding that neither the season, nor other circumstances, were favorable to the expectation of a great crop. It is not in my power to present the Board with any precise statement of the expense. I have no question, however, that conducted in this mode, a carrot crop may be made more productive and much less expensive than the potatoe crop usually is. In sowing, I use a small hand drill, which lays the seed with great regularity, a circumstance very important both to facilitate weeding and harvesting; since if the carrots stand straggling and not in a line, the plough, when harvesting, leaves the more to be loosened by the hoe or the fork, and thus makes the harvesting proportionably more expensive.

Another subject which engaged the attention of the Board, was the *Model of a Rack for feeding Sheep*, transmitted to the Board by Mr. Wilder of Bolton, and which he obtained from some great sheep-farm in England. If I mistake not, Lord Somerville's. Having erected a range of racks on that plan, and it being, in my judgment, superior to any other, which I have either seen, or of which I have read, I enclose, according to the desire of the Board, an outline of the plan laid down to a scale, with a statement of the admeasurements of the different parts of it.

Fig. 1, Represents one of the side pieces, which may be of board, but is best of plank. It consists of one entire piece, sawed into the shape as represented by A, K, D, O, F, E, C, G, H, I.—Two such pieces form the sides of the rack, and may be placed at any distance from each other which may be chosen. Six feet is perhaps the best length, both to give due stiffness to the rack, and to make the feeding trough easily manageable, which must be as long as the distance between the side pieces.

By nailing boards from the points A and K, of one side piece to the corresponding points of the other side piece, the front of the rack is formed as is represented in *figure* 2*d*, at A, A,—K, K. G, G, is a piece of plank two inches square, into which the bars of the rack (*a*, *a*, *a*,) are fixed, which are also inserted into the front board, which extends from K, to K.—These bars are at three inches and an half distance from centre to centre.

By nailing boards from the points I, H, and H, G, of one side piece to the corresponding points in the other side piece, the back of the rack is formed. On the inside, both of the front and back, cleats are nailed for the purpose of stiffening the boards, and for the same purpose a small strip of board is occasionally made to extend from the inside of the front to the beams or rafters of the shed. Both of the side pieces at E and F, are also nailed to the floor.

By nailing boards from the points D, O, and O, F, of one side piece, to the corresponding points in the other side piece, the front bottom part is formed.

The effect of this construction is that the hay is placed at a proper distance, (G, D,) about the average length of the neck from the breast of the sheep, which obliges them to feed in a great degree straight before them, and prevents them, as is usual with them when they can get close to the rack, from pressing the breast against one part of the rack, and feeding the whole length of the neck from another part. The bars of the rack being also only one foot in length, presents no inducement for the sheep to get upon their forefeet, as is usual with them in racks with long bars, and so pulling the hay over the necks and backs of their neighbours.

But the great advantage of this form of rack is the saving of the hay, which sheep usually waste or may refuse. All the space between the corresponding points of the two side pieces

Fig. 1.

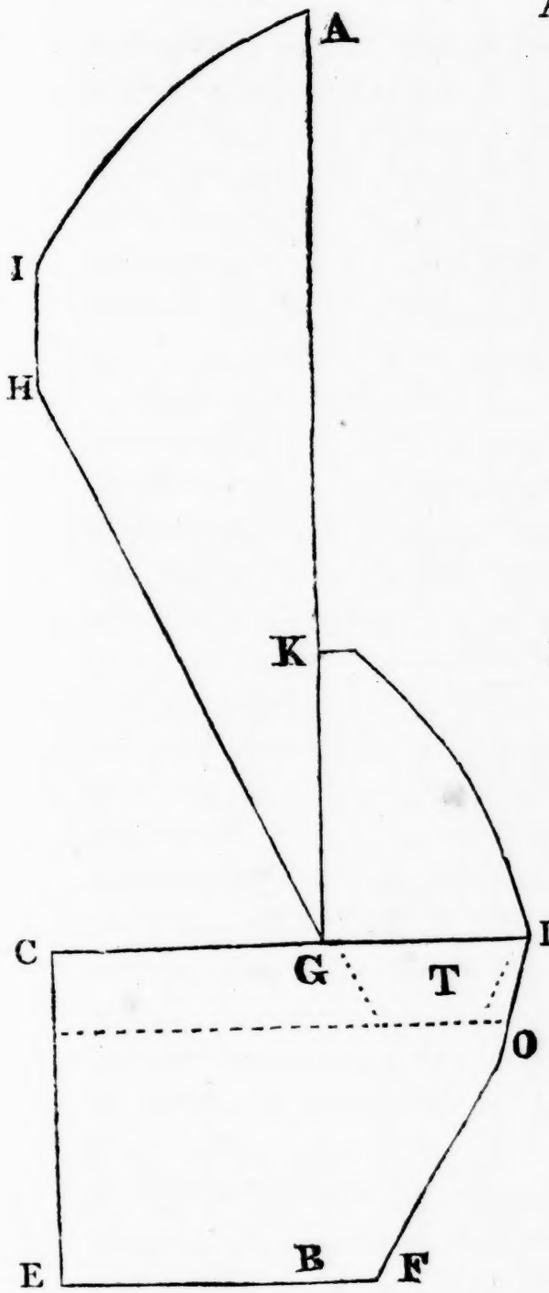
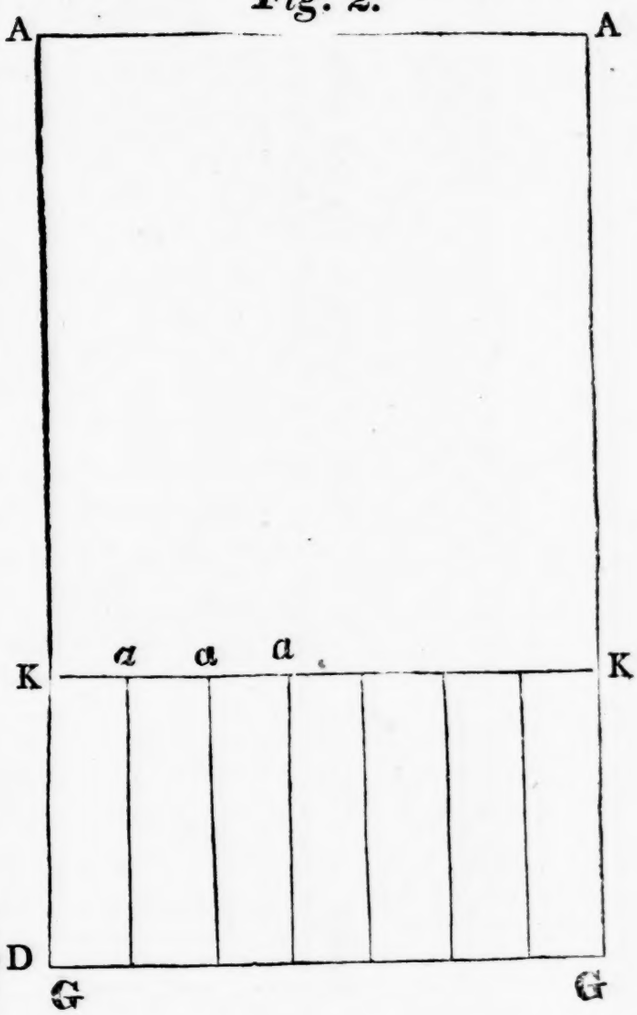


Fig. 2.

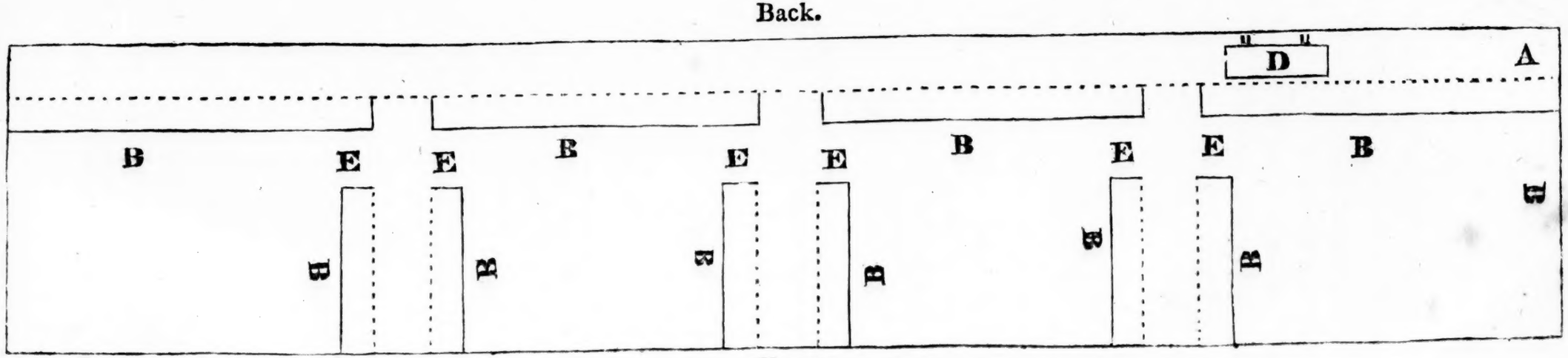


Scale. One inch to a foot.

		Feet.	*Inches.*
A to	B	4	9
A	K	2	5
K	G	1	1
C	E	1	3
E	F	1	$2\frac{1}{2}$
F	O	0	$11\frac{1}{2}$
O	D	0	5
C	D	1	$9\frac{1}{2}$
C	G	1	0
G	D	0	$9\frac{1}{2}$
G	H	2	4
H	I	0	5
a	*a*	0	$3\frac{1}{2}$

T, Feeding Trough ;—$3\frac{1}{2}$ inches deep, 8 inches wide at top, 5 inches wide at bottom. Its length is determined by the distance between the side pieces.

Fig. 3.



Length 100 feet—Width 16 feet.

G, and D, is open. Indeed all the space between the corresponding points of the two side pieces, C, E, F, D, is open. The consequence is that whatever the sheep drop in feeding, falls through the space at G, and D, and by the slanting boards, D, O, F, is determined out of the room, in which the sheep are feeding, into the passage way behind the rack. So that of all that falls, nothing comparatively is lost, and nothing is injured by being mixed with the dirt and manure of the sheep. The saving in this respect is very great. My farmer, who has been much used to feeding sheep, not only in racks constructed in the usual mode, but also in that, which seems to be more approved, in cribs without racks, expresses his most decided opinion on the superiority of this construction. His language was, "not a straw is lost. The saving in two seasons will pay for the whole expense of the racks."

The facility and saving in feeding is another advantage resulting from this mode. The feeder passes in a passage way behind the racks, with which the sheep can have no communication. This passage way ought not to be less than two and an half feet wide, in the clear. If economy in room be not regarded, three feet would be better. But two and an half feet is, for all necessary purposes, sufficient. The effect is that the feeder fills the racks without any disturbance of the sheep, and without that sort of waste and scattering of fodder among the manure, which never fails to occur when large flocks are fed by carrying their food into the space, in which they are kept. The height of the front board A, above the back board I, prevents the feeder from throwing the hay over the rack upon the necks of the sheep. All the offal, or refuse fodder, is daily taken from behind the rack, and upon an average eight cows may be principally kept on this offal, or refuse, of two hundred sheep.

Not only hay, but corn and vegetables are given the flock from behind the rack, and without going into the space occupied by the sheep.

The dotted line, parallel with the line C, D, represents the cleat nailed on the inside of each side piece, on which the trough T, traverses. At the back of the trough are two handles by which it is moved. When the flock is fed with hay, the trough is drawn back to C. Here it is filled; and when the flock is fed with corn or vegetables, is pushed forward to D, where it com-

pletely fills the space between G and D. This feeding is also done without any disturbance of, or from the flock, and when ready, the whole is presented to the sheep at once, which prevents, in a great degree, all struggling for place and priority at the trough.

Upon the whole, I know of no one practicable advantage, which this form of rack does not attain. Certainly it comes nearer to being perfect for its purposes than any I have ever witnessed.

The only objection I have heard made to this mode of rack is, that so much space of building is expended in a mere passage way. But I consider this as amply compensated by the convenience and economy of the plan. Besides the only loss of space relates to the exclusion of it from the mere occupation of the sheep. They have all the benefit which results from the extended area of atmosphere; the communication for the air with the passage way over the racks being unobstructed. If any person wants more racks in a given space than one side of the building allows, he has only to make, at suitable distances, cross racks, by which he can increase the number to be fed as he may deem expedient.

It will not be perhaps amiss to present the ground floor of a shed or sheep house, accommodated for a rack upon this plan.

Fig. 3, Is such a ground plan. A, is the door, by which it is connected with the barn or the deposit of fodder. The spaces B,B, B, are those exclusively occupied by the sheep. The openings at E, are three feet so as to give space for the sheep to feed between the long rack and the small one. At E, may be doors. It is better however, that there should be a permanent partition at least four feet high, so as to prevent any communication between the sheep and the passage way. The plan in this figure is not laid down to any scale, but is intended to represent a sheep house 100 feet long and 16 feet wide. The area being 1600 square feet. Of this space, the back racks and passage way occupy five feet wide of the whole length, or 500 square feet; and the side racks with the intervening passage ways occupy each eight feet in length and seven and an half feet in width, or in the whole 180 square feet,—making a gross deduction of 680 square feet from the whole area for racks and passage ways,

and leaving an area of 920 square feet for the exclusive occupation of the sheep.

The back racks are in length 91 feet; the six side racks eight feet each, or 48 feet—making a total length of rack of 139 feet. This will well accommodate 120 sheep. This gives more than seven square feet for the accommodation of each sheep within the area, exclusively devoted to their occupation. And the area of the whole building, which is the area of their atmosphere, is upon a surface of above thirteen square feet for every sheep. This mode of building enables the proprietor to keep his flock in subdivisions of thirty each if he chooses.

If however sheep feeding upon a larger scale be contemplated, the proprietor will find his purposes, both of economy and convenience, better answered by a building of two stories, each six feet high. The upper story to be boarded on the outside three feet, leaving a three feet opening on all sides, accommodated with sliding, or hanging shutters, to be closed occasionally in storms. A cleated stairway, which shall connect with the upper story about three feet from the back racks, and which shall extend without the building four feet, is a passage sufficiently commodious for the easy ascent of the sheep. In this way 240 sheep may be easily kept under one roof, in a shed 100 feet by 16, and if the proprietor pleases to arrange his yards for the purpose, in flocks of thirty each. If the upper floor be well double boarded, the upper covering the joint of the under boards, the flock above has no injurious effect upon the flock below. By a trap door at D, the feeder ascends to the upper flock; and feeds both equally commodiously. There is nothing of theory in this. The plan suggested is conformable to that on which my own is constructed. My farmer is now in the practice of feeding about 180 sheep in a building of that extent, in flocks of about twenty-five each, and they might easily be extended to the number suggested. In point of health, comfort and convenience the arrangement is unexceptionable.

I know not but that I ought to apologize for this long elucidation of so simple a subject. But as it seemed to be the wish of the Board, I have thought that nothing which might have a tendency to make every point clear should be omitted.

ON THE WORM IN THE HEAD OF SHEEP.

BY GENERAL HUMPHREYS.

Worms in the head of *sheep* in consequence of which, many of all breeds without discrimination have died, particularly in the neighbourhood of Boston, during the last winter, appear from the observation of several intelligent farmers and others, to derive their origin from the same fly, which produces bots in horses. If not the same, they have much similarity in every respect. The fly is supposed to deposit its eggs in the nostrils of Sheep. From these eggs it is thought that nature, in her wonderful economy, gives birth to those reptile animals, which are thought by instinct, to insinuate themselves into the interstices of the brain.

This fly exists in greater or smaller numbers, in different summers and different situations; perhaps, according to the different degree of heat and moisture; or, otherwise from some unknown cause. It is asserted to be a fact, that in some years, these pernicious insects do not make their appearance in some places, which they had formerly infested.

In the heads of numbers of sheep, which have been killed by these worms, where the heads have been opened after death, the worms have been found to resemble exactly bots in horses, but of various sizes and colours: the smallest, which were not much larger than knitting needles, were of a whitish colour; the others, as they approached in size to the bigness of bots, from an olive or greenish brown, to almost black.

In several instances, a handful, at least, has been taken from one head: the brain having been mostly consumed, and the skull containing scarcely any thing besides a small quantity of mucilaginous matter and the brood of worms.

Sheep have lived after a considerable part of the brain had been eaten up by them; and until the skull had become so thin and unsupported from within, that it might be indented, by the pressure of the finger, like a paper box. It is not known how long sheep may live, after a large portion of the natural substance in the inside of the head has been consumed: or, provi-

ded the worms could be got rid of, at how late a stage of the consumption they might be restored to health.

Early in the month of April 1811, a mixed blooded Merino Ewe, having horns like our common breed of Sheep, was discovered to be diseased. This happened at the time, when several of the same flock had died, in consequence of worms in the head. The owner, on taking hold of one of the horns, accidentally broke it off at the root; thus opening a hole towards the brain, and pulling out in the act of avulsion, a number of worms with it. The other horn was immediately sawed off, as deep in the head as possible, and spirits of turpentine poured on the nest. The worms were all killed. The Ewe recovered and is now well. Since that period she has yeaned three times and brought up the lambs.

More than a month after the horn had been broken off, I saw a number of these animals (I think not less than half a dozen) alive in it. They had apparently been nourished by the mucilage in the cavity ; and were extremely difficult to be destroyed. After several experiments had been made, they were finally killed by spirits of turpentine.

In the case here stated, fortunately, the worms lay in the upper part of the head, in such an exposure, that the remedy might easily be applied.

Whenever the worms make their residence in the crevices or cellules in the front part of the head, or lower down towards the nostrils, where it is impossible to reach them, I know of no cure ; unless they can be ejected by some applications of the sternutative kind; or destroyed by trepanning. By the former many sheep have been preserved. Snuff or any thing conducive to sneezing may be used with success.

The perforation of the skull (with the second mentioned object in view) I have not seen attempted. But I am credibly informed, that the lives of a considerable number of sheep in Connecticut have been saved this spring, by trepanning them. This is said to have been performed successfully on the side of the head, towards the cheek, near the eye.

The symptoms of the disorder occasioned by this fatal worm are often displayed in the whole organic system, and vary so much, that our common farmers, who are generally their own shepherds, are not unfrequently led by them, to attribute the

loss of their sheep, to almost any other, rather than to the real cause.

A defluxion of *mucus*, visible in the nostrils, is commonly one of the first symptoms of the disease. This is frequently attended by a cough.

And unusual dulness and humidity are observable in the eyes; together with an appearance of heaviness and sadness in the general aspect; lassitude and restlessness in all the movements.

In many cases, a refusal of food takes place; or, at least, the appetite becomes fastidious, and continues to be more and more vitiated. Debility ensues, and is termenated only by a lingering death.

In other instances, the appetite remains good to the very last.

In others, the facility of digesting the food appears to be in a great measure lost; and they are carried off suddenly by a kind of dysentery or incurable scouring. Sometimes they are observed to stagger and have convulsive motions; their strength having been greatly impaired and their joints become very weak. In a small number of cases, their nerves as well as their muscles have been quite differently affected, in an extraordinary manner. A few sheep, while yet their appetites remained good, have had their necks so turned on one side of a right line, and so stiffened in that direction, that they could not but with the greatest difficulty, resume a straight position; nor stoop their heads to the ground.

In the part of the country where my flock is kept, no instance of mortality from this cause has come to my knowledge during the last year. If the fly existed there, in the course of the last summer, probably the calamity has been prevented, by the precautions adopted to keep that pernicious insect from the nostrils of the sheep.

If *antidote* be preferable to *disease*, *prevention* better than *remedy*, it will be worth the while for holders of flocks, to have recourse to a simple and cheap process; to which the exemption from this evil may probably, in a great measure, be ascribed.

It is recommended, that they would cause a sufficient quantity of tar, mixed with sulphur or any thing offensive to the smell, to be provided; and to have this put with a brush, on the lips or the noses of all their sheep, at shearing time; and to have it repeated, a few times, in the course of the summer. Scatter-

ing tar in as soft a state as it can be easily made, in the troughs and on the boards where the sheep take salt, is likewise practised by our farmers.

It is believed that these precautions will deter those destructive insects, from their instinctive pursuit of depositing their eggs, in the nostrils of Sheep: and thereby prevent the future mischief.

When Sheep are seen running from place to place, as it were distracted with agony, and rubbing their noses against any thing they can meet, for the purpose of getting quit of the flies, which sting them, it may be too late, to begin to think of an *antidote* or *remedy.*

Boston, June 8th, 1815.

[Same subject continued, in a letter from E. Ticknor, Esq. to the Hon. Josiah Quincy.]

Boston, 6th December, 1815.

SIR,

SINCE the conversation I had with you yesterday and the statement you made to me of the loss of several of your sheep, I am induced to detail to you certain facts and circumstances, which took place during the last spring or winter in New-Hampshire, in the neighbourhood, where I am now keeping my flocks of Merinos. The complaint of which your sheep died appears to me to be the same as that, of which Capt. K. who is now keeping a flock of Merinos for me, lost several of his fine native sheep the last season. The complaint made its appearance by their lopping their ears, shaking their heads, stupidity and loss of appetite, which at length ended in consumption and death. This gave him great uneasiness, not being able to discover the disorder, which made such havock among his sheep. He was very well convinced he should lose his whole flock, if no remedy could be found. When the last was taken however, he left it in his sheep-fold to die without much care or trouble, not knowing what farther to do; as he had done before, as he thought, every thing in his power. While it thus lay, a swine came along and bit off its nose, which excited the owner's feelings so much, that he directed his man to knock it on the head with an axe, which he did. The first blow forced out, say, a handful of large, full grown mag-

gots which very much astonished him, as he had never before seen the like. The disorder of the others was now satisfactorily demonstrated before his eyes, and he was convinced more than ever, that a cure was beyond his reach. It being, however a very singular complaint to him and which excited much of his curiosity, he was led to inquire of all his friends, who had been in the habit of keeping large flocks of sheep, whether they had ever discovered the same disorder among any of theirs, and, if so, what remedy they had found to be the most efficacious? He soon learnt, that a large flock in a neighbouring town had been attacked by the same complaint and as a remedy, which proved effectual, vinegar was forced by a squirt gun (which every boy in the country can make,) through the nostrils into the cavity of the head, which so disturbed the nest of maggots, that it produced a heavy convulsion and sneezing of the animal, by which it disgorged the contents of the head, which had been so long tormenting and vexing it. The Sheep afterwards I understood, grew healthy and well and had no return of the complaint for that season, which shew, that the vinegar was effectual and the cure perfect. Of the manner by which these maggots find their way into the cavity of the head as a proper and safe resting place for growth and subsistence, the public have often been informed. Every one, who is acquainted with rearing and managing sheep, knows that nothing is so vexatious and troublesome to them as flies, which are frequently lighting upon and disturbing their noses and faces. Upon the mucus, which runs from their noses, the flies lay their eggs, which they snuff up and which lodge in the head, and there live and grow, till the animal dies, or by some great convulsive exertion, discharges them from the head and it then revives and grows into health and vigour again.

Knowing the great interest you take in agricultural improvements and preservation of the breed of sheep called *Merinos*, I have taken the liberty of addressing to you the above facts and circumstances, which are seldom discovered, except by accident, *even* by the most attentive and sagacious shepherds in the country.

SUCCESSFUL USE OF PLAISTER OF PARIS AS MANURE ON THE SEA COAST. MEADOW LAND REDEEMED BY RIDGING.

[To Thomas L. Winthrop, Esq.]

New York, December 8th, 1815.

DEAR SIR,

I AM favoured with yours of the 28th, ult. requesting to be informed of the result of my experiments with Plaister of Paris on lands in the neighbourhood of salt water. Having plenty of manure on the shores of my farm, I have had little occasion for any other. To satisfy myself however, of the effect of Plaister so near the salt water as my farm is situated, I sowed an acre or two on the highest part of it on tough sward, leaving as much ground adjoining unsown; that part on which the Plaister was sown produced nearly a double crop to the other; it grew about ten days longer before it was fit for mowing, leaving the surface in an open mellow state.

I intend making use of a considerable quantity the next season. My farm is nearly surrounded with salt water. Plaister has a wonderful effect on high gravelly soils, destroying the frails that grow upon it, bringing in the first season a fine crop of clover. I have not made any experiment on this kind of land myself, not having any of this character on my farms. Plaister has no good effect on low moist lands.

The greatest improvement I have made and am now making on my farm is, in turning swampy, boggy lands into the finest of English meadow, producing three tons to an acre the second year after preparing it, which is done (after the brush, stones, &c. are cleared off,) by ridging.* It costs about 100 dollars per acre to complete the operation. In its natural state it was not worth twenty dollars an acre. It now brings me the interest of 300 to 400 dollars per acre. There is a great deal of this kind of land laying almost in a useless state in our country.

W. ROGERS.

P. S. I should advise to sow from one and an half to two bushels of Plaister per acre.

*I make my ridges a rod wide, in the manner of turnpike roads, leaving them very smooth.

BENEFICIAL EFFECTS OF PLAISTER OF PARIS AS MANURE.

[To Thomas L. Winthrop, Esq.]

SIR,

AGREEABLE to your request, I transmit to you all the information I have been able to collect from the farmers in my neighbourhood, and all that has resulted from the experiments I have made in the use of the Plaister of Paris. I think that on our moist hill land we receive the greatest benefit from it, but it is difficult to ascertain exactly what the increase of the crop is in consequence of the use of the Plaister. In some instances I believe on grass land the increase has been one half, and on corn nearly as great, but the average increase would however be much less. As to the mode of using it and the quantity used on the acre people differ very much. I should say with us the usual quantity sown on grass land is from one to three bushels per acre, and on corn about the same quantity, which is either put into the hill, when the corn is planted, or put round the corn before the first hoeing. But as we have not used so much in the vicinity of Charlton as in many other places, you, no doubt, will be able to obtain better information from some other source than I am able to give, but all I am possessed of I give you, sir, with pleasure.

I am, &c.

SALEM TOWN, JUN.

OBSERVATIONS ON THE CULTIVATION OF POTATOES.

[From the Farmer's Magazine for 1801.]

HAVING long entertained an idea that the formation of apples upon potatoes was detrimental to the crop, by drawing away a large and valuable part of the nourishment from the roots, I this year made an experiment which I think goes a great way to solve the question. Having planted some of different kinds,

I had the flowers carefully picked from several of the drills as soon as they appeared, leaving, between every drill so picked, a drill with the flowers untouched. In some cases I allowed the flowers to expand and even to make some progress towards setting, in others, I suffered the apples to form, and pulled them off when they were half grown. In the drills where the flowers were gathered as soon as they appeared, the crop was doubled to what it was where the apples were allowed to come to maturity; where the flowers were allowed to waste themselves the crop was less abundant, and where the apples had made some progress it was still less, though greatly better than where they had been left untouched. In short, from the time of the flowers appearing, and as long as the leaves continued green and the stems growing, there appeared an advantage from gathering both the flowers and apples gradually, diminishing however as they approached the ultimate period of their growth. I remarked also that the stems of the potatoes in the drills, where the flowers had been picked off, continued green and vigorous much longer than where they were suffered to grow, and also where the apples were gathered at an early period. I, at the same time, made trials as to the effects of cutting the *haum* at different stages of its growth, all of which I found ruinous, the deficiency of the crop being in exact proportion with the earliness of the cutting, with this addition, that the potatoes were ill ripened and of a very bad quality. I also made a careful trial, as to the advantage of drawing up the earth to the stems, which I find greatly superior to that of cleaning away the weeds without giving them any earth at all. In this last case, I not only found the crop less abundant, and by being exposed to the depredations of vermin and weather, quite spoiled, I found also that no benefit arises from early planting, as they do not vegetate till a certain period, and in the mean time are exposed to every injury from the frosty and wet weather. Potatoes may be produced a month earlier by putting them in a warm place early in the spring, allowing the shoots to grow an inch or two, leaving the top of the shoot nearly above the surface. They may the first year be brought to their utmost perfection, by gathering the apples early in the season, hanging them in a dry place till new year, and then cutting them to pieces with fine dry sand, after which they may be sown in a hot bed, or in a box placed upon warm dung. As

soon as they have put out the rough leaf they should be transplanted in drills richly dunged, and put pretty deep into the earth, leaving only the top uncovered. Where this is done at an early period of the season the crop will be considerable, and every property, possessed by the different kinds, ascertained the first year.

ON SHEEP TICKS.

BY GENERAL HUMPHREYS.

Some discouraging circumstances having occurred to the breeders of sheep, in the loss they have sustained by diseases and casualties, until lately but little known in their flocks, it is judged expedient to point out some of the antidotes and remedies, which may have a tendency to prevent the recurrence of so great a misfortune; and thereby to relieve the farmer from his disheartening apprehensions.

It is true, that during the present year, a larger proportion of sheep than usual, have been tormented with ticks; and that, in all instances, they have proved extremely distressing and injurious; in some, fatal.

Generated after their kind, and not passing through different forms and characters in the different stages of existence, as is the case with some vermin and insects; *predisposing causes and timely precautions*, may, doubtless, occasion an increase or diminution in the procreation and spread of this instinctive enemy to the wool-bearing tribe.

Attention to the essential articles of food and cleanliness, it is apprehended, will generally prevent ticks from multiplying so fast, and becoming so numerous, as to be very detrimental. They are more frequently found on lean, dirty, and young sheep, than on others.

The constant irritatation and itching pain excited by these blood-suckers, whenever permitted to take undisturbed possession of their prey, will cause those sheep, and particularly those lambs which were poor and feeble when first attacked, continually to lose their flesh and to become daily poorer and feebler, and will not suffer any others which were in somewhat

better condition, to thrive or even keep their condition, under the most careful treatment, and with a plentiful supply of the best kinds of nourishment.

The cure must be radical, or the evil will increase. No palliatives will be able to restore the declining flock to health and vigour.

According to my general information, merinoes have been less frequently annoyed by ticks, than other breeds of sheep.

If such be the fact, probably the partial exemption from this afflictive visitation, may be attributed, at least in some degree, to the more attentive management of merinoes; the other breeds having been neglected, from an opinion of the inferiority of their value.

Whenever ticks begin to be discovered on any small portion of your flock, or even on a single sheep, they must be destroyed immediately, or the whole flock will be in danger of being overrun and greatly injured by their rapid propagation. Few animals seem to increase so fast.

Various methods have been proposed for destroying ticks. Tobacco, snuff, corrosive sublimate and solution of arsenic, if so thoroughly applied by any process as to reach them, are effectual. The two first are deemed preferable, as being less liable to be attended with unfortunate accidents in the use, and equally efficacious.

Chancellor Livingston's mode is explained in page 180 of his Essay on Sheep. The smoking machine of Mr. Charles Edwards, for killing ticks, is described in the 113th page of the Massachusetts Agricultural Journal, for the month of May, 1814. Both these processes are thought well of, by practical men as well as theorists, as capable of being successfully put in practice.

In large towns the refuse or waste tobacco, possessed of sufficient strength to kill every tick to which the effluvia can extend, may usually be procured from the manufacturers of snuff and cigars, for about one dollar a hundred pounds weight. Damaged snuff, equally well adapted to the same purpose, may also be obtained cheap. Whenever this shall be the case, it will perhaps be unnecessary to resort to any other expedient. The *expense* of this remedy and the application, in either way, including *that* of the time employed, is very small; probably not more than from half a cent to a cent apiece for the flock.

The principal obstacle will consist in the imaginary or real difficulty of being provided with the apparatus, however easy and simple the instrument and machine may be in their construction; as well as in the awkwardness and reluctance, which men almost always manifest in new undertakings.

Whenever these requisites cannot be had, or the processes be tried without incurring so much difficulty or inconvenience as to deter the common farmer from the attempt, it is understood, that other substances, deleterious in their nature, applied in a different manner, will produce the same effect.

My chief design in this paper is, to state a few strong, and perhaps, interesting facts.

In the neighbourhood of Humphreysville, for some years past, for the purpose of preventing sheep from being infested with ticks, the farmers have tried an experiment which has been attended with complete success; that is to say, they have been in the habit of immerging them annually, (not far from the shearing time) in a decoction of the herb, vulgarly called Poor Anna, or Bear Weed; known amongst our botanists by the name of American *white hellebore*. For a description of its growth, appearance, and properties, I refer to the annexed note.*

* The Poor Anna, or Bear Weed, (*Veratrum Viride,*) Ait. (*Swamp Hellebore,*) (*White Hellebore,*) (*Poor Anna,*) (*Bear Weed,*) &c. a large, green leafy plant. It is found sometimes in swamps, but more frequently by the sides of brooks. The stem is erect three or four feet high. This plant when in flower, bears some resemblance to the maize or Indian corn. The leaves are numerous, about three inches broad and nine inches long, plaited and nerved embracing the stem. The root is perenial. The skunk cabbage, (*pothos fetida,*) has sometimes been mistaken for the hellebore. A very little attention of a person, not in the habit of examining plants, will be sufficient to distinguish them. The skunk cabbage puts forth its vegetating appearance earlier in the spring than the hellebore. The flower of the skunk cabbage appears in March and April, much sooner than tbose of hellebore. The skunk cabbage has no stalk. The flower of the skunk cabbage is directly upon, and often half buried in the ground.

These plants resemble each other much more in the roots. They both have a main root and radicles much alike. The root of the skunk cabbage is larger, the radicles are also larger and more spongy, and terminate more abruptly than those of the hellebore.

The *veratrum viride* has long been a popular remedy for the itch. It is a very acrid plant; its acrimony resides in every part, but more espe-

The experiment has been made in conformity with the following instruction.

Take as much of the roots, stalks, and leaves, as can be grasped in both your hands, with the fingers loosely extended, and sufficiently curved to embrace them; boil the mass in a quantity of fresh water, proportionate to the number* of sheep to be dipped therein, (varying the measure of the herb and water according to circumstances,) continue boiling this vegetable substance over a brisk fire, until the whole essence of the plant shall have been extracted, and the water tinged to a dark brown colour by the commixture of the juice. Then let the liquor cool in a suitable vessel.

A convenient vessel or tub may be provided by sawing a hogshead asunder in the middle, and appropriating one of the halves for the purpose.

The preparations having been made, seize the sheep or lamb by all the legs at once, or if too heavy, let two persons take hold at the same time, one by the legs before, the other behind,

cially in the root. It has been used for all the medicinal purposes, for which the European species has been recommended; viz. for gout, rheumatism, cutaneous affections, as a purgative, and in powder, to excite a discharge from the nostrils. It is unquestionably one of the most powerful vegetables contained in the catalogue of the articles of the *materia medica*, whether given internally or applied to the surface. Dr. Herberden, speaking of the root of the white hellebore and the seeds of the staves-acre (a species of larkspur) says, "when applied externally they are safe and effectual, in a degree which may make it probable, that besides their acrimony, they have some specific powers in cleansing the skin from foulness."

For the cure of the itch, the hellebore may be used, in the proportion of three drachms of the root to a quart of boiling water. No ill effects follow the external use of this article, except that if made very strong, it excoriates.

The farmers frequently soak their corn previous to planting it in a decoction of the hellebore roots, for the purpose of destroying crows. It is peculiarly destructive to the feathered tribe; and from late experiments it has been found very efficacious in destroying insects.

N. B. The writer is indebted for the description of this useful plant, to Dr. Ives, one of the professors in the Medical Institution of Yale College.

* The quantity thus taken has served for any number from 50 to 100.

and plunge the animal with the back downwards in the decoction, taking care to keep the head above water, so that none of this impregnated liquid enter the mouth, or contiguous orifices. On taking the sheep from the tub, squeeze the fleece gently, and suffer the liquor to drip off into the vessel: thus proceeding, one by one, with your whole flock.

In the fleeces of 130 yearlings, which were treated in this manner, when full of ticks last summer, only two ticks were living when dipped this season; but a vast number of dead ones were discovered mixed with the wool.

It is a well known fact, that after shearing of sheep the ticks pass directly from the sheep, thus bared of a covering, to the unshorn lambs, in such great abundance as often to produce the worst consequences. Wherever this mode of prevention has been practised on the lambs, not one tick has been found on them for many months.

In collecting and comparing such facts as I have been able to ascertain, the result of my inquiries and reflections is, that in no other country are flocks less liable to suffer from disease or disaster, than in our own.

Humphreysville, June 20th, 1815.

P. S. Mr. Stone, an intelligent and attentive farmer in the vicinity of Humphreysville, who has been very successful in the cultivation of the fine-wooled breed of sheep, in the latter part of the month of June, 1815, tried the following *experiment*.

Mr. Stone selected twenty-five lambs of his flock, to which great numbers of ticks had resorted, after the shearing of his sheep, and immerged the said lambs in tobacco water, prepared by decocting stems and refuse tobacco, in common well water. On a careful inspection twenty-four hours afterwards, there was not one tick found alive on them.

The next day, at my suggestion, he plunged an equal number of lambs of the same flock, in the same predicament as to ticks, in a decoction made from *poor anna* or white hellebore, and on an examination twenty-four hours afterwards, discovered most of the ticks to have been killed, and the few that were living apparently struck with death. He thinks the decoction of poor anna or white hellebore was not quite so strong as he ought to have made it. Had it been otherwise, he is of opinion, that the

same consequence would have resulted from it as did from the tobacco.

This mode of destroying ticks by a decoction of tobacco, instead of snuff or tobacco smoke, was suggested to him by Mr. Kneeland Towns of New Haven, an excellent breeder of merinoes, as being cheaper and easier in its application than any other method which he had attempted, and not less effectual.

Boston, July 3d, 1815.

AN ACCOUNT OF THE STATE OF THE SHEEP ON NANTUCKET ISLAND.

[To W. Hammatt, Esq.]

Nantucket, 6th month, 26, 1815.

AGREEABLY to thy request I shall now attempt to inform thee of what circumstances I can, relative to the sheep on this island, and the loss of them the winter past, and the causes thereof; after first taking a view of the state of the island and sheep sixty or seventy years past, as communicated to me by those who lived at that period—at which time the soil was much stronger generally than at the present time, (exceptions must be made,) as thou knowest, as well as myself, that many small tracts have been very much improved. At that period, it was a rule among the sheep owners, to take off half as many sheep and lambs, as their flock produced lambs; which rule they found would do to practise, and their flocks would maintain their number. Since that period the soil has been declining, principally owing to large fields being annually planted with Indian Corn, the succeeding year sowed with oats, without any grass seed being put on it; so that in lieu of the sweet grass, such as white clover, &c. there came up a wild sour kind, which sheep will not eat. This gradual depreciation of the soil, together with (as I think) the unskilful management of the proprietors in confining their stock to a small part of the land, with an intention of keeping the other part for winter, while the first growth was lost, has within a few years reduced the size and flesh of the sheep

very much. At the commencement of last winter, also several preceding winters, they were in a very thin state of flesh, even below what they should have been in the spring. Even with moderate winters, they now barely hold good their number from year to year. The sheep of this island were very thin last fall, consequently poorly clothed, and not prepared to stand the rigour of the most severe winter ever remembered by our oldest men. The sheep which run at large on the common are at least three quarters of all on the island. As respects the ticks, I do not discover that they have done more than they have usually done to injure the sheep. The report thou heardest respecting them, probably arose from some of us who had our sheep by ourselves. Having learned by authors, that the ticks were injurious to sheep, we made some efforts to destroy them, by fumigating with tobacco, which, if thoroughly done, I believe is effectual. Thou wilt hereby discover my opinion relative to the destruction of the sheep; that it was occasioned by repeated snow storms, their thin state in the fall, the want of shelter and food—particularly the latter. The general loss was equal to the number of last year lambs and one half the sheep, so that the owners of the sheep sheared about half as many as they did last year.

That so many should have lived is unaccountable to me; as I cannot discover that they could have found food, equal to one good meal in thirty days. They could not have obtained any thing more than a little brush. My opinion was at the time that they would nearly all die, that were not taken up.

It never has been the practice to fodder sheep in the winter which are kept on the Common land of this island. We that had our sheep in Plainfield had sufficient fodder for a common winter, but not enough for the last; but we fed them all winter with a portion of stalks from corn, and with turnips,—but not enough.

I sheared in Quaise last year one hundred and thirty sheep, and killed or sold from the flock in the course of the season about sixty sheep and lambs. This year I sheared one hundred and twenty-four—notwithstanding, I came so nigh my last years number, after taking about sixty, yet I lost many; having had a large number of lambs, and those that I lost were mostly half merino blood.

If this incorrect statement will be of any use to thee or thy friends, it will gratify me; the incorrectness I speak of is in the language, and not in the facts.

If at any time I can furnish thee or thy friends with information that will be useful, I shall be pleased in doing it.

I am, &c.

OBED MITCHELL.

INQUIRIES ADDRESSED TO FARMERS.

[With a view to collect the most accurate information on the principal branches of agriculture, as now practised, the following queries are addressed to intelligent farmers and to Societies instituted for the promotion of agriculture. The answers subjoined are from the DUNSTABLE AGRICULTURAL SOCIETY.]

Question 1. OF what quantity of land do the farms in your vicinity generally consist?

Answer. From seventy-five to one hundred and fifty acres.

Q. 2. What is the quality of the soil?

A. The soils are various and of different qualities; some light sandy, some strong gravelly loam, some loam not gravelly, a pretty large proportion of fresh meadow.

Q. 3. Into what portion of pasture, mowing and tillage, orcharding and wood, are farms usually divided? Are the orchards improving or declining? Do they yield a competent supply of cider?

A. About one tenth of the whole farm is used for tillage, one sixth for mowing, one fifth pasturing, the remainder orcharding and wood-land, together with lands unimproved, and some unimprovable. Our orchards are declining through age, and the ravages of the canker worm.

Q. 4. How much land on each farm is annually (on an average of years) planted or sown with grain of any kind?

A. About one tenth of the whole farm is sown or planted.

Q. 5. In what manner in the land prepared, manured, and seeded with each kind of grain, and what is a medium crop?

A. The principal grains raised in this town are rye and corn; some barley and oats. The rye is generally raised on light pine land by the summer fallow; sowed the last of August and in September, (mostly in September,) and seeded about one bushel to the acre: the crop from six to ten bushels per acre. Corn is raised by ploughing in the spring, spreading coarse or winter manure on the ground, or putting compost manure in the hill: crop from fifteen to twenty-five bushels per acre.

Q. 6. In what manner is Indian corn cultivated, and what is the medium crop on an acre?

A. By ploughing in the spring once, sometimes twice; furrowing one or both ways, at from three to four feet apart; manuring as above; hoeing three times, and ploughing between the rows at each hoeing: crop as above.

Q. 7. What is the quantity and value of the straw on an acre of barley, rye, oats and wheat *respectively?* And to how much upland hay are they *respectively* equivalent for fodder?

A. Rye straw is the principal straw with us, and will produce half a small load to the acre, but it is little esteemed for fodder. Oats will produce a small load of straw per acre, and is equivalent to one fourth or one sixth its quantity of upland hay for fodder.

Q. 8. What is the value of straw of each kind, for any purpose, *other than fodder or litter?*

A. It is used for making cider, covering coal-pits, &c. but the value is small.

Q. 9. What is the value of the stover or stalks on an acre of Indian corn, and to what quantity of upland hay is it equivalent for fodder?

A. Value five dollars: equivalent to one third of a ton of upland hay.

Q. 10. What quantity of land, on a medium farm, is annually planted with potatoes? How is the land prepared? What quantity and kind of manure is applied to an acre, and in what manner? How much seed is used, and how is it selected? How are they cultivated, and what is the medium crop?

A. From half to a whole acre. Generally a piece of sward land is broken up, by once ploughing, then furrowed; manured by putting ten or twelve loads of coarse winter manure in the hills, per acre; seed, ten or twelve bushels per acre, sometimes

cut into sets, sometimes used whole; crop from one hundred to two hundred bushels per acre.

Q. 11. How many bushels of potatoes are equivalent, ordinarily, to one bushel of Indian corn, for sale?

A. From three to four bushels.

Q. 12. How many days labour of a man are usually employed on an acre of Indian corn, including the getting in all the stover and stripping the husks from the ears?

A. From ten to twelve days.

Q. 13. What is the labour of shelling a hundred bushels of Indian corn, and in what manner is it performed?

A. The labour is performed with the flail on a floor, and the corn winnowed; and will take three or three and an half days to thresh and clean one hundred bushels.

Q. 14. How many days labour of a man are usually employed on an acre of potatoes, including the getting in the crop?

A. From twelve to thirteen days.

Q. 15. Is there any order or succession of crops known to be beneficial or pernicious to the soil?—If any, what is it?

A. It is best to change the kinds of crops on land kept for tillage. All English grains have a strong tendency to impoverish the soils, unless the ground be ploughed soon after the crop is taken off, so as to turn in the weeds, grass and other stuff while green, before the frost kills and destroys them, which answers as a light coat of manure.

Q. 16. What is the usual course of crops?

A. Where lands are kept wholly for tillage, the crops are alternately a crop of corn and a crop of rye.

Q. 17. What is the medium quantity of hay produced on an acre of upland, and what is the labour of mowing, curing, and housing it?

A. Quantity from ten to twenty hundred: labour from two and an half to three days.

Q. 18. What is the medium product of hay on an acre of fresh meadow, and what is the labour of mowing, curing, and housing, or stacking it?

A. Quantity from fifteen to twenty hundred. Labour from one and an half to two days, if the weather be good.

Q. 19. What is the proportion of value which fresh meadow hay bears to upland hay, each being of a medium quality?

A. Proportion of value as one to three.

Q. 20. Is any tillage land laid down with grass seeds without sowing grain at the same time? If so, which method is found best?

A. None are so laid down.

Q. 21. What are the kinds of grass cut on the upland for hay? What proportion is from seed sown by hand, and what are the kinds thus sown, and in what quantities *respectively* per acre?

A. The kinds are clover, herds-grass, and red top, with some others which come in spontaneously; three fourths of which are sown by hand, viz. the clover, herds-grass and red top. Quantity sown on an acre various.

Q. 22. Are any grass lands *new* seeded after scarifying them with the harrow only, or in any other mode, without ploughing? And what is the success of such practice?

A. No grass lands are new seeded without ploughing.

Q. 23. What weeds, vermin or insects infest the mowing lands?

A. Weeds are not troublesome. The mole infests the low and meadow mowing. A worm, the species not known, sometimes destroys patches of the upland mowing, and also of the pastures, by eating the roots. In some particular places, the yellow weed or crow foot is considerably prevalent.

Q. 24. Are the spontaneous or cultivated grasses infested most?

A. The spontaneous; but we are but little injured by vermin or insects.

Q. 25. What methods are used to destroy weeds, vermin or insects without ploughing the land, and what is their success?

A. No methods are used.

Q. 26. What kinds of beasts, and in what numbers are they respectively kept, on medium farms? And how are they subsisted?

A. One horse, two oxen, four cows and several young cattle, and from eight to twelve sheep. All are universally subsisted by grazing in the summer. In winter, the horse feeds on upland hay, the others subsist mostly on fresh meadow hay; towards spring, they are allowed some English or upland hay, corn, stover, &c.

Q. 27. In what place and in what manner are the cattle fed with the coarse winter fodder? Is it given in the stable, in the yard, or in the field? Is it chopped or given whole?

A. The cattle, being generally housed, are fed in the stable over night; some of the coarsest fodder being flung into the yard in the day time. The fodder is almost always given whole.

Q. 28. How much butter is usually made in a year from a cow, all the cream being churned? And how much skim-milk cheese is made from the same cow?

A. None are so managed. A middling cow will make seventy-five pounds of butter in a season, all the cream being churned.

Q. 29. What food is given to sheep, besides grass and hay?

A. But little. In winter, especially towards spring, a little corn, beans, or potatoes, are given occasionally to them.

Q. 30. What is the value of the subsistence of a sheep through the year, besides the pasturage?

A. Value besides the pasturage from one dollar to one dollar and twenty-five cents.

Q. 31. What is the value of pasturage for a sheep compared with the pasturage of a cow?

A. Five or six sheep to one cow.

Q. 32. What is the ordinary weight and value of the flesh of a sheep when fit for the butcher? And what is the quantity of wool in a fleece?

A. Weight from 40 to 50 pounds. Value five cents per pound. Wool from two to three pounds.

Q. 33. What breed of swine are propagated? How are they fed? How fatted? At what age are they killed; and what do they then weigh?

A. Breed various—small boned best; fed the first year with potatoes, bran, whey, and the kitchen wash, with some Indian meal; fattened mostly with corn, or corn meal, sometimes with potatoes boiled and mixed with meal; age 20 months; weight 300 pounds.

Q. 34. What number of bee hives are kept? What is their product in honey and wax? What is the management, and what are the obstacles which discourage their extensive propagation?

A. But few are kept, they do not prosper well, and we believe the cultivation of them is not well understood.

Q. 35. What is the usual quantity of land sowed with flax seed? How is it manured and cultivated; and what is the medium produce of flax and seed in quantity and value?

A. Our soil is not congenial to flax, and but very little is raised; what is raised is commonly sowed on new or gross lands, after a crop of potatoes, as being the crop which best prepares the ground for flax.

Q. 36. How much labour is employed on a quarter of an acre of flax, before it comes to the spinner, and including the preparing the seed for market?

A. Not rightly known.

Q. 37. In what articles consists the surplus of the farmer, which is sold or exchanged for other articles?

A. In rye, corn, oats, some beans, pork, beef, some butter, some cheese, some cider.

Q. 38 How many loads of manure are collected (estimating thirty bushels to a load,) from the cattle in the barn yard, of a medium farm, in a year, specifying the number and kinds of cattle kept on the same farm, and the manner in which they are kept in relation to confinement or ranging abroad?

A. Twelve head of horned cattle, one horse and ten sheep kept up in the yard will make from 60 to 65 loads; and much more may be made of a very good quality by carting into the yard, meadow mud, bog, &c.

Q. 39. What quantity of manure is made in the hog-pen? specifying the number of swine fatted, the kind and quantity of food consumed, and the weight of flesh produced?

A. Two hogs made to weigh 300 each, fattened as before stated, and properly provided with bog, rubbish, &c. will make ten loads of good manure.

Q. 40. What methods are used to enlarge the quantity, improve the quality, or prevent waste of the manure, made in the barn-yard or hog-pen, and especially to save the stale of the cattle?

A. But very little attention has till lately been paid to enlarge the quantity or improve the quality of manure made in our yards; of late some attention is paid to carting into our yards meadow mud, straw, and rubbish. No means used to save the stale of cattle.

Q. 41. Is the manure and tillage labour exclusively applied to the best part of each farm?

A. Mostly so; land which is suitable for tillage and mowing, when reduced, is ploughed, planted and manured about two years, then laid down to grass; is sown with clover, red top and herds-

grass, all or a part of them, according to the nature of the soil; our poorest lands lie unimproved.

Q. 42. In what manner and for what purposes is manure used, except those indicated in the foregoing inquiries?

A. Of late considerable compost manure is spread on our moist mowing ground and also used in our gardens.

Q. 43. What other manures are used besides those created by the stock, and what are their merits compared with these?

A. The only manures besides those created by the stock, are mud from pond holes and meadows, bleached ashes, sometimes ashes not bleached. The merits of these, especially when used for corn, are nearly equal to stock manure for one crop, but does not equally enrich the land.

Q. 44. Is lime-stone found in your vicinity? Is it used as a manure?

A. Not found in this town; but is in Chelmsford, 12 miles from this—not used as a manure.

Q. 45. Is Buck-wheat cultivated for the food it yields? or is it used to clense the soil from weeds, to fertilize and enrich it, or for any other purpose?

A. Buck-wheat is not raised in this town.

Q. 46. In what manner are new lands brought under cultivation? Is it customary to plant orchards in the new settlements?

A. The wood and timber are cut off, then ploughed with a team of 12 or 14 oxen, to tear out and kill the shrub oaks and other small brush which are with us very prevalent. We have no new settlements.

Q. 47. How is land cleared, which bushes and under-brush have overrun, since the trees were carried off?

A. Cut, and the brush burnt, then ploughed as before.

Q. 48. What is done with swamps or swampy lands?

A. Many of them remain in the state of nature. But when designed for improvement, we drain them, if practicable, take off the brush—sometimes seed is sown; but oftener the spontaneous grasses are mowed without further cultivation.

Q. 49. Is the growth of wood for timber and fuel equivalent to the consumption in your vicinity? If not, what measures are taken to provide against the inconvenience of future scarcity?

A. It is believed the growth of wood in this town, is equal to the consumption by its inhabitants, excepting what is carried to

the market. Considerable quantities are carried to the Merrimack river, and transported through the Canal to the metropolis.

Q. 50. Are wood lots generally fenced, or left open for cattle to range in without restraint? In getting your wood for fuel, do you pick the oldest trees, or do you cut clear? Which method is best calculated to increase the value of your wood lands?

A. Our wood lots are a considerable part of them fenced, and the town by vote restraining cattle and horses from running at large, and thereby preventing the young shoots from being constantly cropped as formerly, our wood lots are doing very well, and we apprehend no scarcity. It is generally practised to cut the oldest and most decayed trees, leaving the rest.

Q. 51. What are the causes that the culture of wheat can no longer be pursued on the sea coast of New England? [*Not answered.*]

Q. 52. How far has Gypsum, (Plaister of Paris,) been fairly tried as a manure in the maritime parts of this state? What have been the effects of the experiment? [*Not answered.*]

Q. 53. Is the European practice of a succession of crops found to be expedient in this country, and in what order ought such a succession of crops to take place? [*Not answered.*]

Q. 54. Is it perfectly ascertained, that with proper attention to manuring the land, it is more advantageous to change the crops than to keep it in grass?

A. A considerable part of our English hay being cut on dryish soiled land, it is to us evident, that with the best attention to manuring, the grass would run out, unless tilled and manured; of course, we are obliged to change the crops.

Q. 55. Is there any crop so profitable as grass, taking into view the state of markets in our country, and the distance at which most of our farmers are from a market?

A. Our soil, not congenial to grass, is more profitably used in the raising of grain, particularly rye, which is raised on our pine lands, where grass would not thrive.

Q. 56. Can the farmers raise any crop which, on the whole, affords them so great a profit as grass, unless they are within twenty miles of the capital?

A. From our observations on the 54th and 55th queries it will be perceived that, in our opinion, grain is a more profitable crop.

Q. 57. What are the most profitable crops which the state of Massachusetts, taking one year with another, furnishes? [*Not answered.*]

Q. 58. What has been found to be the difference of profit between the Merino sheep, and the sheep which formed our former stock? [*Not answered.*]

Q. 59. Is there any cheap fodder which can be raised for sheep during the winter, which will supersede or diminish the consumption of hay? [*Not answered.*]

Q. 60. What is the comparative profit of a farm adapted to the raising of sheep, between the cultivation of Merinoes, and the raising of any other cattle? [*Not answered.*]

Q. 61. Is there any profit derived from the raising of Indian corn, except for the subsistence of man, which can equal the employment of the same land in raising grass for the support of sheep and cattle during the winter? What are the calculations on which such profits are founded?

A. We believe there is; our calculations are as follows—it is obvious that the labour on an acre of Indian corn on our easy land is not great, and with a little manure will produce 15 or 20 bushels per acre, where if laid to grass the hay would little more than pay the getting.

Q. 62. What are the improvements in dairies, which have been made within the last twenty years? Is the quality of butter and cheese improved? And in what consists this improvement? And what are its causes? [*Not answered.*]

Q. 63. Are there any improvements in the tools of husbandry, which experience has confirmed, and what are these improvements? [*Not answered.*]

Q. 64. Are there any new and valuable fruits or productions, either contributing to the pleasure or profit of the citizens at large? What are they? What the mode of culture, and what their qualities? [*Not answered.*]

Q. 65. Are there any improvements in the breed of cattle? What are they, what their qualities, and where can they be obtained? [*Not answered.*]

Q. 66. Are there any other improvements, not comprised under the articles of manufactures, which have been made in any branch of agriculture? [*Not answered.*]

INTERESTING REPORT ON THE STATE OF THE WOOL TRADE OF ENGLAND,—JULY, 1815.

BY LORD SHEFFIELD.

[From the Repertory of Arts, &c.]

THE Wool Fair which was held at Lewes on Wednesday the 26th July 1815, was attended by the respectable and principal wool growers of the county. Lord Sheffield, the President, made his Annual Report, of which the following are extracts.

He said he had foreseen and repeatedly represented the necessity of checking the immense importation of foreign wools: they had increased in a most extraordinary degree, and infinitely beyond even what had been apprehended. He had stated at former meetings that on an average of twenty years, in the beginning of the last century, when we plumed ourselves so much on our great staple manufacture of wool, the importation of foreign wool was only 869,727 pounds; and the average of eight years previous to the French revolution, viz. ending 1789 inclusive, was 2,660,828 pounds; but that in the last year, 1814, the importation of foreign wool was 15,712,517 pounds; and in the quarter ending 5th April 1815, 3,624,925 pounds.

This increased and increasing importation, he observed, was so alarming, that notwithstanding his age, and forty-six years attention to all country matters, entitled him to decline all meetings, he once more troubled the meeting with his opinions on a subject so interesting to them all,as well as to the public; and begged leave to repeat the necessity of an application to the Legislature, for protection for the fine wools of the United Kingdoms from which England in particular, for centuries, had derived extraordinary benefits, and its manufactures great credit.

The article wool, his Lordship continued, is the only produce of the island which is not protected; all other foreign articles which interfere with the growth or manufacture of the country, are restricted by protecting duties; and it is both just and politic thus to protect the produce and manufactures of the country. The legislature lately most wisely raised the duty on the importation of grain; and if that had not been done, the growth of

grain in this country, would have been so discouraged and diminished,that we should have become dependant on foreign countries for our subsistence, and often liable to the extreme of famine. Wool is just as much entitled to a protecting duty as grain, or any other produce; but every discouragement is inflicted on the wool growers, and wool is the only article of produce of which the export is prohibited. If the landed interest will not make known its grievances, it cannot expect attention or redress, and it will be responsible for the ruin which will fall on the growth of fine wool. For if the wool of all countries is to be poured in upon us without restraint, and untaxed, every man the least acquainted with the subject will agree with me, that it never can be worth while to raise fine wool in this Kingdom; and the agriculturalist will aim only at quantity, neglecting the quality of the wool. In every point of view it will be highly mischievous. We should consider what immense sums will go out of the country for that article. 15,712,517 pounds imported last year cost this country, at the low rate of 2*s*6 per pound, nearly two millions sterling. A duty of 1*s* per pound on the imports would have added to the revenue £785,625. One shilling per pound added to the import, 2*s*6, would only raise that article to the price of the English fine wools prepared for the manufacturer, in which state foreign wool is generally imported. The present price of superfine woollen cloths *raised nearly one third within no long period*, would amply pay the amount of that duty. The foreigner is able to grow his commodity at half the expense of the British farmer, and there being at present little demand for wool, except in this island, it all comes here. *The manufacturers of fine cloths never had greater profits.* They enjoy an extraordinary monopoly. All the wools of Europe come here for a market. All the wools of Britain are *impounded* here for their use.

It must surely be expected, and it must happen, that British fine wool being so great a drug, and the price so low, the wool grower will find it his interest to promote the growth of the coarse and heavy wools,* which will pay him per fleece much more

* It ought to be recollected here, that the Leicester sheep yield a fleece of from 8 to 11 pounds weight, of the coarse kind of wool. The average weight of fleece of the common sheep of America is from 2 to 3 pounds.

than the fine wools. It is however particularly to be regretted, at a time when the greatest improvements in the fine wools were in progress, through the spirited exertions of many individuals in this country, that such a check should take place.

I learn with much concern that in consequence of the circumstances I have stated to you, much wool of the finest quality has been sold in this country at 1*s*10½ per pound; and this in many instances per fleece of so fine a quality as to weigh only 2 pound, and a considerable quantity has been sold under that price; and I have not heard of any that has been disposed of at a higher price than 2*s*2 per pound. Mr. Weston of Essex, well known to you as one of the most intelligent country gentlemen and farmers, has sold at 2*s*2; but at Colchester Wool Fair, the general price was 2*s* for fine wool of the Southdown and Norfolk flocks, and that was likely to be the general price of the year. I understand also that a large quantity was sold and the whole might have been disposed of if the holders of the ordinary sorts had not fancied they should have as much as for the best sorts.

At Hereford and Ross Fair, Ryeland wool sold at 2*s*4¾. And *Spanish mixtures* from 3*s* to 4*s* per pound, according to their fineness. Mr. Clive of Whitfield sold his Ryeland Merino at 3*s*7 per pound. At Ross Fair, very good wool of the Spanish mixtures only obtained 3*s*4½ per pound. At Hereford, short wool sold at 2*s*.

RECAPITULATION.

Ryland wool, - - - - - -	£0	2	4¾
At Hereford, Spanish mixtures, - -	0	3*to*4	0
Ryeland merino, - - - - -	0	3	7¼
At Ross, Spanish mixtures, - - -	0	3	4½
Short wool, - - - - - -	0	2	0

The debasement in the price of our fine wools, although principally produced by the immense importation of foreign wool, is increased by the great depression which the farmer suffers, in consequence of the ports having been left open so long that all the ware houses along the Thames and at Liverpool were crammed with foreign wheat; and this debased price happening after as bad a crop of wheat in this island as perhaps has occurred for many years, has impoverished the country in a degree scarcely known before; nor will the farmers have a reasonable price for their wheat, until these magazines are emptied.

The agriculturalist being thus depressed by an immense importation of foreign grain and foreign wool, has not the usual means of employing workmen; consequently also the shopkeeper, the tradesman and mechanic suffer, together with the whole community, from the cessation of that expenditure which employed them, and fed the poor. The farmer is obliged to sell at any rate, and thus the produce of his farm is greatly debased. But as the Legislature has seen the necessity of checking a ruinous importation of grain, we may flatter ourselves that it will attend to the case of the wool grower, and extend the same protection to him as has been so wisely afforded to the farmer. But unless the case of the wool grower and the difficulties under which he labours are properly represented, it cannot be expected that they will be removed.

But I shall add that there is sufficient ground to expect an extraordinary demand for wool, in consequence of the complete subjugation of those who have so long disturbed the world and deranged its commerce. France and the other countries which have been overrun by desolating armies are exhausted, and will not immediately re-establish their former occupations and settle to manufactures. It is therefore most probable there will be a very unusual demand for those of woollen, not only from the countries alluded to, but also for those countries which used to be supplied from those parts which have been ravaged by war.

The thanks of the meeting were voted to his Lordship, for the information he had so ably collected and for his instructive observations on the subject of wool.

HINTS TO WOOL GROWERS.

[The writer of the following article is a *Wool Sorter* from England, recently arrived in this country, and now in the employ of Mr. Z. Hayden, of Boston, Woollen Draper and Wool Stapler.

It was formerly very common in the counties of Kent and Lincoln, in England, to meet with large quantities of matted, cotted, tyed, or pelted-fleece wool, which was the natural growth of many sheep, and which was of course much increased, when the animal was from any cause deprived of its common supply of food

for any length of time, which will frequently unavoidably happen during the winter, and also by sickness, and not unfrequently be occasioned by the disorder called the scab. But these incidents would not operate so powerfully as to produce a confirmed cott, were it not in the nature of them. It would only be slightly tyed, or impoverished on the ground, or cotton of the fleece, or in the middle of the staple, or any other part, according to the time these occurrences took place ; frequent demonstration of this occur to the wool sorters.

To prove the last case beyond a doubt, when sorting the long wools, and when they are intended for Combing Manufactories, you will find the staple to break exactly at the place where the impoverishment or sickness shall have taken place. It is therefore, incontrovertibly proved, that when a confirmed cott takes place, it proceeds from the constitution or state of health of the animal.

Scurfy or thick pelted sheep will generally be found to be very liable to the scab, a disorder which frequently causes the pelting and cotting of the fleece, or is otherwise very detrimental to the wool, and makes it sometimes very *hard ;* sheep having a thick pelt will be found, when minutely observed, not to thrive half so fast, as those which have thin pelts or skins. These latter will never be found to be scurfy, or pick themselves unless they really have the scab ; and to this they are not half so liable as the former. The latter kind have been known in England to improve one shilling per week more than the former.

The improvement in breeding sheep in England has been so great that it was common formerly to keep their wethers fatting till they were four years old, whereas at this time they will acquire more fat at two years. Therefore, attention should be paid to select your buck or ram free from all those defects, and your ewes having those defects should be marked off to be fatted or sold ; but as the latter do not infect the general flock so fast, it is not so much an object as paying strict attention to the former, which, if not sound, or of good breed, will soon spoil a whole flock, as a hundred and upwards may be annually infected with any defects the ram may possess.

There are other defects in the growth of wools of this country.

The first is, that a great quantity of wool is infested with a loose hair, generally called *kemp*, by the clothiers, sorters, and

wool-staplers. Many of the fleeces are so completely beset with this loose hair as to render the wool not half so valuable, as these hairs will not take any dye. All wools therefore, of that description, are very injurious to the manufacturers, as they will spoil the colour of a whole piece.

There are also many flocks that have fleeces which have coarse points, or spiry tops, which are also detrimental to the manufacturer, as such wools will not spin so well, and when manufactured, the coarse tips will lay at the top of the cloth invariably, to the great detriment of it. This defect will operate, ultimately, to produce a depreciation in the price of the wool.

There are likewise some fleeces that have a large coarse breech, which may also be removed with the other defects.

In order to convince the gentlemen graziers, farmers, and growers of wool, how easy it is to remove all these defects treated of, it will only be necessary to inform them, that thirty years since you could not meet with a lot of wool of the Kentish or Lincolnshire growth, but what would average five per cent and upwards of confirmed cotts, which used to be sold with the lot, and two pounds given for one to to make up the value of the good wool free from defects. Even within these twenty years, I have seen lots of wool nearly, if not altogether, infected with cotts, or in some degree, more or less ; whereas, now it is not common to meet with any, even in those lots of wool where it was hereditary formerly, and some lots are entirely free from being cotted, even of Kentish wool. The sheep on Romney Marsh never receive any hay or other food but what they procure for themselves, in the most severe and long continuance of frost and snow.

It appears in this country, that the graziers and farmers conceive their sheep ought to be kept very high or fully fed, and that it improves the quality; but it is thought that wool of sheep kept so high is not so good as the wool of those sheep that are kept in low feed. For making cloth, the wool is better for being short, thick, chubby staple. As to sheep which give combing wool,they cannot be fed too high,as that prevents the staple breaking in the act of the process of combing, as it has to be drawn several times through the combs; but the latter wools are seldom or never wanted in this country.

WILLIAM BARKER.

EXTRACTS FROM THE BATH SOCIETY PAPERS, 1799; WITH REMARKS BY JOHN LOWELL, Esq.

A CORRESPONDENT of that society warmly recommends a species of manure for potatoes which I think peculiarly applicable to our country because easily attainable. It is the employment of *mould*, and *fallen leaves* taken from the woods. This the writer observes he has found an excellent substitute for other manure. He found the potatoes raised in this way much more mealy and of a flavour much finer than when produced by the application of the ashes and dung; and he considers it of great importance to poor people who have not the means of procuring much dung. This he observes can always be procured in woody countries, and in those which are not so, it may be obtained under hedges, and in ditches and old ponds.

If this be a fact, and we have little doubt of it, since it is well known that few substances are more favourable to vegetation than rotten leaves, and the soil formed by their decomposition, there is scarcely a farmer in Massachusetts who may not by two or three days labour collect enough to plant all his potatoes, and thus save his manure for his corn and grass lands.

The same writer suggests a mode of fattening hogs on potatoes, which, as it is new, and has certainly the appearance of ingenuity, I will transcribe. "The next article which occurs to me," says the writer, "is the application of potatoes to the feeding of hogs. I have tried *every* mode of application, and find the following to be the best. I bred my hogs in a wood park appropriated almost solely to this purpose, during the spring and summer; and about the beginning of October, I let such of them *only* as I mean to fatten into the farm grounds, where they have the run of the stable, the clover fields and pastures, taking care to have them well wrung. I then have a pretty large fold prepared for them in my potatoe ground, into which they are driven every evening, and over every fold I strew a few horse beans (a small quantity of Indian corn would answer equally as well.) Here they will fill themselves well. They lie warm on the haulm of the potatoes, and by leaving behind them a great quantity of the

finest and strongest dung, they amply repay what they take away. If the potatoe ground be dry and not sufficiently easy for their working out the potatoes, a light plough run over it will facilitate the business and they will do the rest. This seems to be the manner in which nature means the hog should find his food; and having wisely formed the vent for this purpose, I am convinced that he derives more relish and nutriment from potatoes thus found than if given to him in any other way. For if thrown to him in the stye he soon gets satiated with, and loathes them.

I have tried boiling, straining, and various other modes, and find this the best. The hogs being shut out from them during the greater part of the day, they come to the potatoes with redoubled relish at the close of it.

Two thirds of the preparation of them for market being thus done, the remainder is soon accomplished, by taking them into the styes and finishing with grain, or barley meal and peas, and which will be found much better applied in this way, than by mixing with the potatoes in the whole course of feeding.

This article is not recommended, except for experiment; where farmers happen to have small enclosures of potatoes, it may be well to try the effect of this mode of feeding hogs. It certainly will save much labour; and if they do thrive better, it may be a very useful practice.

THE same writer mentions what would be very valuable, if successful, a mode of perpetuating clover crops.

"In the month of October I carry on to my clover grounds and spread a good top dressing of dung, ashes, &c.; this I suffer to lie in a loose easy state during the winter which shelters and invigorates the plant, and better enables it to withstand wet and frost. The beginning of April following, I sprinkle over the ground fresh and good clover seed, at the rate of six pounds to the acre, with about half a bushel of rye grass, (if wanted.) I then run over a fine dressing harrow each way, which serves as a hoeing and cleaning to the former plants. The new seed is then pressed down by a roller. Hence will arise an annual succession of new plants, and the objection to the instability of clover crops will thus be obviated.

Bayberry wax plant—Myrica Cerifera.

An English correspondent has expressed a great desire to know more of the history of this plant, and it seems he looks to us for this information. It is among the very common though mortifying cases in which, if we would learn the history of one of our own native productions, unknown in Europe till after the discovery of our country, we must go to European writers for this information.

Not a single attempt it is believed has ever been made in our country to propagate this valuable plant. Yet it would seem that it is pretty extensively cultivated in France. On a very short examination I find there have been not less than three considerable treatises on the culture of it, by French writers. One by M. Tessier, in the Annales de l'Agriculture, tome 14. One by M. Arsenne Thiebout de Berneaud, and the last by M. Rast Maupas. The latter has cultivated it with success in the neighbourhood of Lyons. It is stated that from twelve pounds of bayberries he produced one pound of wax. This latter work is not in this country. It is only from a notice of it in a French periodical work that we learn these facts ; we are not able therefore to state to *what extent* his cultivation proceeded.

It is desirable that some gentleman should furnish us an account of this plant, the probable amount of its products in our State, and that some enterprising man would undertake the culture of it on a small scale and communicate the result of his experiments, that the publick may be able to determine whether its merits would repay a more extended cultivation. It is certain that it has been cultivated in other countries, which cannot be more congenial to it than its native soil and climate.

In Tessier's Annales de l'Agriculture, tome 43, page 185, the following method is mentioned of preserving the health of fruit trees in grass lands.

The numerous sorts of grass are well known to be ruinous to fruit trees, especially while young. The fruit is smaller when they are thus surrounded with grass and of inferiour flavour.

They have very successfully remedied this difficulty in Germany, by surrounding the roots of trees with hemp breakings, not only surrounding the stock near the ground but also covering the earth with them for some distance from the tree. They acquire by this means a surprising vigour. They employ with

equal benefit the dead leaves of trees, just covering them with stones or some other heavy substance to prevent their being blown away.

It is said, that such measures would also effectually prevent the descent or rise of the canker-worm.

We noticed in a former publication, that it was the custom in some parts of Rhode-Island to surround the apple trees with breakings of flax to, prevent the ascent of the canker-worm, and that it was found successful.

Tall Oat Grass.

It seems that the tall meadow oat grass, *avena elatior*, lately introduced on the recommendation of our correspondent, Justin Ely, Esq. has been long known in England, and is a natural grass there.

In the Bath papers for the year 1799, it is thus described:—*avena elatior*, or tall oat grass—this grass is very luxuriant, it is rather coarse, but makes tolerable good hay. It is common in all meadows.

In Willich's Domestic Encyclopœdia, it is thus described:—The *avena elatior*, (Holcus Avenaceus of Dr. Smith,)—tall oat grass or oat, thrives on wet damp soils, in meadows, pastures and hollow ways. It flowers in June and July. This grass vegetates with great luxuriancy, and though somewhat coarse, makes tolerable good hay. It is eaten by cows, goats and sheep, but is frequently troublesome in arable land, as its roots spread like couch grass, and are very difficult to be eradicated.

In a note to Davy's Agricultural Chemistry it is thus noticed:—*avena elatior*, tall oat grass—this is a very *productive grass*, frequent in meadows and pastures, but is disliked by cattle, particularly by horses. This perfectly agrees with the small portion of nutritive matter which it affords. It thrives best on stiff clayey soils.

On analysis it appeared to yield less nutritive matter from the same weight than most other grasses, but its whole weight per acre is much greater than almost any other.

We are induced to publish the foregoing, lest it should be supposed that we meant to recommend its adoption generally.

From what we have seen of it, we think it will never take the place of the meadow fox tail and some other grasses, though it may prevail against Timothy or herds-grass. It will have two advantages over the latter, it is a very early grass, and produces a great after-crop.

It is however a coarse grass, and it would seem is not very nutritive. The gentlemen farmers may rely that this new grass, called the tall oat grass, is the same as those above described by British authors. It has been accurately compared by botanists here, and it is certainly the same.

COMMUNICATION; IMPORTANT TO WOOL GROWERS.

BY MR. ZEBAH HAYDEN, *of Boston.*

My business for a few years past, has brought particularly within my observation, the great instability in the sales of sheep's wool of American growth. The demand for the article, and price which it has, from time to time, borne, have been equally irregular. I have frequently been led to inquire into the cause, and endeavour in my own mind to point out measures which might, at least in some degree, tend to remedy the evil.

Permit me, sir, to suggest to you some of my ideas upon this subject. Should they meet the approbation of the trustees of the Massachusetts Society for promoting Agriculture, I doubt not but they will exert their influence in rendering them useful to the public.

The state in which the article has generally been offered in market, I conceive to be one of the most prominent causes of the irregularity in its sales. The greater part of our fine wool has heretofore been offered in its natural unwashed state, and of the remainder, very little has been *well* washed. In its natural state it is well known that the quantity of yolk and dirt varies essentially, according to the *degree* and *kind* of merino blood, the method of keeping the sheep, &c. It has usually been wound up in fleeces, with the skin side *out*, which presents the best appear-

ance, and *too* frequently with all the taglocks and manure carefully enclosed.

Among that whichhas been washed, too little attention has been paid to clearing it from tag locks and manure. In some instances it is believed deception has been practised by mixing that of different grades, and marking it according to the highest. In some instances it has been found to contain much sand, and very frequently barn litter, &c. Under these circumstances, it has been extremely difficult for the *best judges* to determine any way near the real value of the article in all its various states; it could not therefore be expected of our numerous manufacturers, in the infancy of their establishments. They have seldom had the opportunity (to say nothing of its inconvenience,) to open and examine all the fleeces of a lot before purchasing. The consequence has been, that they have bought of the same grade and at the same prices, at different times, that which has varied in its loss on cleansing, from thirty-five to sixty per cent. Many have bought *native* for *half—half* for *three quarters blood*, *merino*, &c. They have been so frequently deceived in the article as to produce among them a *general* and *strong* prejudice in favour of that of foreign growth. They know the value of Spanish and will purchase it, while they approach American as they would a lottery, under the just impression that the chances are against them. And this, sir, cannot be wondered at; they might as well purchase corn without measuring, or cotton without weighing, as to pretend to determine the quantity of yolk and dirt in a lot of unwashed wool.

As a remedy for this, I should propose that an uniform method of preparing sheep for shearing, and packing up the wool for market, should be recommended to the wool growers, under the sanction of the Massachusetts Agricultural Society, through the medium of the public newspapers. This method, in order that it may be generally adopted, should be too simple to be inconvenient; it might be as follows. Wash the sheep in as warm water as can conveniently be had, (always avoiding that which is salt or brackish) as clean as practicable; after which, let them run in a *clean* pasture from seven to ten days, as circumstances will admit, for the purpose of renewing, in a small degree, the *yolk* or grease which is alike necessary to the preservation of the wool, and the further cleansing it when necessary. During the time

of shearing cautiously avoid barn litter and other dirt. After carefully separating from the fleece all tag locks and manure, wind it up as tight as possible with the skin side *inward*. After which it would be well to put it into a clean dry apartment for a week or more, for the purpose of drying before packing it for market. The most convenient bags may be made of tow cloth of from 7-8 to 4-4 wide, of three breadths each, from two to two and one quarter in length.

Should this method go into general practice, it would, I conceive, by rendering it much less difficult to determine the value of American wool, be a great step towards putting it upon a fair competition with that imported, and cause a more regular demand. It would also be in suitable order for the operation of stapling, a pre-requisite to a proper inspection.

A second cause is, the admission of foreign wool into the United States free of duty. This gives the manufacturer an advantage at the expense of the wool grower, which in addition to other discouragements presented by the close of the war, has a tendency to retard the progress of that interest, which, if properly fostered in its infancy, may probably in a few years not only furnish a sufficient supply of wool to our manufacturers, at as low and perhaps at lower prices than could be fairly imported, but a surplus for exportation.

As a remedy to this, it is expected by some, that Congress will lay a duty on the importation of the article. But as this is of very considerable consequence to the agricultural interest, would it not, sir, be well for some of our most influential agriculturalists to use their endeavours to procure from different states, petitions to Congress for this object, during their present session?

A third cause is the want of sufficient capital on the part of most of our manufacturers, to enable them to purchase wool on the short terms of credit usually offered by the growers.

Their goods are slow in *turning*. The liberal terms on which imported woollen goods are usually sold renders it necessary that *they* should be equally liberal in *their* terms, in order to obtain fair prices. If they hold their goods for cash, they must either sell very moderately or lower than they can be afforded; their goods are not of that uniform character which will command fair prices at forced sales. Those, therefore, who sell on liberal terms and make a reasonable profit in their business, soon

find a respectable capital swallowed up, and themselves reduced to the necessity of taking advantage of liberal terms in their purchases, or selling their goods on such terms as will give them little or no profit; their capitals, therefore, are not sufficient, though in most cases respectable, to enable them to purchase wool with cash or on short credit, without forcing the sales of their goods at low prices; thus some have been under the necessity of discontinuing their business, while many others are doubtful whether to proceed further: this particularly affects the sales of wool at the present time.

The remedy to this lies but in a small degree within the power of the wool growers, and further I shall not attempt to consider it.

Many of them perhaps have not sufficiently considered how much the sale of the wool depends upon the circumstances of the manufacturers, upon their abilities and success, and the almost inseparable connexion between the two interests. Having been in the habit of making quick sales of the other productions of their farms, they have too confidently expected the same of their wool, have wondered why it would not command the cash at any time at something near its value, without duly considering that the demand for it is limited to a particular class of purchasers, whose abilities to purchase are subject to continual variations, according to their success in their business.

They have not perhaps considered that American wool has not yet become an article of merchandize, that its price has not settled down to an export value, that when our *manufacturers* can buy, *they* can sell, and not otherwise, unless at *very reduced* prices.

They have too generally offered their wool for cash or on short credit only; and manufacturers, under the necessity of purchasing, have too frequently bought without a fair prospect of being able to be punctual in their payments. They have, therefore, a just claim on the wool growers for liberal credit on their wool; and the growers of wool must, I conceive, consider it for their common interest to be as liberal as may be fairly within their power and convenience, in their terms of sale to the manufacturers.

A fourth cause, which constantly operates against the sale of wool, is the general prejudice which exists in the public mind

against woollen goods of American manufacture. It cannot be denied, that during the infancy of our numerous manufacturing establishments, many bad goods have been made, and that many have been grossly deceived in the purchase of them. This has produced a prejudice too well founded to be easily removed; which at present very unjustly operates equally against the sale of those of the best quality. But so rapid has been the progress of improvement in the manufacture of many kinds of goods, that very considerable quantities are now made, which are but *little* if *any* inferiour in any respect to those of the same kinds usually imported. Should this course of improvement continue, that prejudice must in time thereby cease to exist; but as its operation is particularly felt at the present time, every exertion should be made to counteract its tendency. Measures more immediate in their operation are called for. The manufacturer who offers the best of goods as low, at least, as they can be elsewhere found, calls for support. The wool grower should be the first to step forward in his cause; it is for his interest and perhaps his duty.

Let him clothe himself and family in American cloth, (of good fabric) and thus recommend the production of his own sale; let all our wool growers thus dress themselves and families, and it is believed that the prejudice against American goods of most kinds, will soon be lost. To this end, would it not be well for some influential man of this interest to recommend it publicly, and at the same time point out the places where the best may be obtained of warranted quality.

January 5th, 1816.

ON BURNING STUBBLE.

BY MR. W. CURTIS.

[Communicated by J. Prince, Esq.]

MR. W. CURTIS of Lynn, Norfolk, found very beneficial effects from burning the stubble of oats, which was left eighteen inches high for that purpose, on a field broken up from old pasture the same year; he afterwards sowed wheat and oats in succession on the same ground, the stubble of both which were burned in the same manner. The ashes were in every case

ploughed in to a small depth, and the verges of the field mowed previous to the burning to prevent accidents. After the third crop of corn, all of which were abundant and remarkably free from weeds, the field was laid down with clover and grass seeds, and the ensuing crops of both hay and grass proved infinitely finer than those before the ground was broken up.

Another piece of land was cropped for three successive years in the same manner as the first, to which it was similar in every respect of soil, aspect and previous management, but in which the stubble was ploughed in instead of being burned; the produce of each crop on it was much inferiour to that of the first experiment, and the weeds increased so greatly, that on laying it down to grass, they overpowered the grass seed so much that it was necessary to re-sow it; and ever after, while Mr. Curtis held it, the grass and hay produced were coarse and full of weeds, and consequently inferiour both in value and quantity to those of the other field, on which the stubble had been burned.

Note. This is a proof of the meliorating quality of carbonaceous matter to land and the great benefits of burning, both in producing this matter and in extirpating weeds in the most effectual manner—it is recommended previous to burning to carry one or two furrows round the field and to commence burning on the leeward side to prevent accident, if near any building.

[*Pub. Board of Agriculture*, 1805.]

TREATMENT FOR THE ROT IN SHEEP.

[In a letter to William H. Sumner, Esq.]

DEAR SIR,

THE regimen I pursue in cases of the rot in sheep, is pretty nearly as follows :—

I restrict them in the use of green food, and, if in summer, permit them to go to pasture only for an hour or two in cool of the morning and evening, but they are never turned out until the dew of the morning is dissipated. By frequent and sparing supplies, I endeavour to induce an appetite for dry food, such as ground Indian alone or mixed with oats, malted barley, corn or oats, and fine sweet hay. Care should be taken to furnish such

food only as is very nutritive, and at the same time readily digested; as the digestive powers of the animal in this disease are evidently much impaired.

I endeavour to excite the stomach to its natural tone, and to restore the appetite by the frequent and moderate use of tonics; and in cases where lambs have been the subjects, I have given regularly every morning a half gill of rye whiskey in a half pint of fresh milk. The decoction of white oak bark is doubtless a very proper tonic, and so perhaps would be that of the inner bark of the wild-cherry tree. The leaves and boughs of pine and cedar may also be classed under this head; at any rate I always give them to my sheep when afflicted with this disease.

Sheep in this complaint are affected with an unnatural craving for drink, and in order that this also may contribute something towards the effect to be produced, viz. the bracing and invigorating of thin, pining and emaciated systems, I give them as their *only* drink, a decoction of fine hay, commonly clover.

Instead of salt, which (except in situations bordering on the ocean) is always necessary, I give *chalk* mixed up in the form of paste, with strong brine, and poured into the troughs where it adheres without interfering with their feeding, and is scraped off and eaten with avidity, for the relish which its saline taste gives it. I was led to this by observing that rotten sheep had a particular propensity for eating earth, which upon dissection after death I found in considerable quantities in the fourth stomach. This I construed into that instinctive disposition or tendency in almost all animals, when labouring under disease, to avail themselves of certain remedies which an all wise Providence has placed within their reach for their relief; and it seemed an indication of Nature to the use of some calcareous and absorbent earth, which might reduce the superabundant juices of the stomach or rectify their acidity. Of the correctness of this theory, I leave you to judge: you will at any rate agree with me in opinion, that such would be the chemical operations of chalk, but whether its nature is changed by a combination with salt, I am not chemist enough to determine. It is at any rate a simple remedy, and can do no harm.

Besides this, I have been in the practice of giving strong salt and water, in doses of about a gill, to a lamb of six or eight months, once a day, as a remedy for worms of the stomach.

These worms are about two inches in length, and exist in the fourth stomach: they resemble the red silk of corn, and are found knotted together in a mass, frequently as large as ones fist. They are soon destroyed when put into salt and water. I will not pretend to say that these worms are an invariable concomitant of the rot, though I have found them to exist in all the sheep I have ever lost with this disease.

By a patient adherence to this regimen I have cured seven or eight sheep out of ten, which laboured under all the symptoms of the most inveterate rot; even after the swelling of the throat had become permanent, and so large as evidently to be burthensome to the animal.

Rot is certainly *not contagious;* like scurvy, it proceeds (in *my opinion*) either from depraved or watery and insubstantial food; more especially when the transition from better to worse is sudden and great, as for instance the case of old sheep taken from high dry pasture, to which they have long been accustomed, and placed on marshy ground. A sudden change of the weather from a long drought to a great deal of rain, often produces the same effect. In the case of lambs, owing to the sudden loss of their natural aliment, at a time when, in consequence of great rains, the grass is watery and insubstantial. Hence it appears to me that the disease may generally be prevented, if proper attention be paid to prevent the occurrence of these predisposing circumstances.

That your little flock may be preserved from its ravages, is, my dear sir, the sincere wish of

Yours, &c. SAMUEL D. HOWELL,
of Pennsylvania.

ON THE UTILITY OF SALVING SHEEP.

[From the Virginia Argus.]

COMMUNICATED BY J. PRINCE, ESQ.

I HAVE long thought of communicating to the public, a remedy for the cure of the rot and scab in sheep, which I have made use of with very great success.

In the year 1806, my flock was so very indifferent, that from ninety sheep, I sheared only one hundred and thirty pounds of

wool, so sorry as to be barely fit to make clothing for young negroes. Immediately after shearing, I made use of the following mixture: three gallons of tar and three gallons of train oil boiled together, to which were added three pounds of roll brimstone, finely pounded and stirred in. This quantity was sufficient for the above number, and was poured on with a ladle, from the top of the head along the back bone to the tail.

At the next shearing in 1807, from seventy-eight of the same sheep, I sheared three hundred and sixty pounds of very good wool; and instead of twenty or twenty-five sorry lambs, commonly raised from my flock, I raised fifty-five as fine as I ever saw. Since this application, I have frequently been asked by my neighbours, where I got such fine sheep. It may be necessary to add, that I have continued to make use of this application with the same success.

J. NELSON.

Mecklenburg, 13*th June*, 1808.

Note. It is presumed the above receipt must have been for the *scab only;* and it also serves to shew that that disorder was known in the United States long before the introduction of the valuable breed of merino sheep.

Recipe for the Rot in Sheep: Young's Annals, vol. 13, *p.* 209.

"Give to each sheep one spoonful of spirits of turpentine, mixed with two of water, after fasting twelve hours—let them have three doses, staying six days between each dose; this is said to have been used with success, even in cases where the fleece has been nearly gone, and the throat terribly swelled."

SINGLE HORSE CARTS MOST USEFUL.

[From Dickson on Agriculture, vol. I.]

A VERY intelligent correspondent, who has paid much attention to the importance of carts in husbandry, found, in constructing single horse ones, that the capacity of waggons was by no means a just rule for them. From those with which he was acquainted, containing in the bed or *buck* ninety-six cubical feet, being

twelve feet long, four feet wide, and two feet in depth; it was supposed, that to give one horse the fourth of the load of four, it would only be necessary to give them the space of twenty-four cubical feet, or to make them four feet by three, with a depth of two feet; but it was soon observed that the power of a horse was so much greater in working singly than in a team, that they might be enlarged so as to have the dimensions of five feet one inch in length of buck (or bed of the cart,) three feet seven inches in breadth, two feet in depth, and to contain thrirty-five cubical feet and a fraction, making the proportion of the one horse cart to the four horse waggon as thirty-five to ninety-six—more than one to three. This places in a striking point of view, the advantage such small carts have over large ones in the quantity of work performed. The great superiority of these carts is rendered still more obvious and striking by the observations, "that two horses with single horse carts will draw as much as three horses with one cart; that a common carrier at Carlisle who many years employed a waggon, has laid it aside, and now uses single horse carts only; as he finds he can, by these means, carry much greater weights."

It is likewise supposed, that the superior goodness of the roads in Cumberland, may be ascribed to the general use of single horse carts; and that wherever waggons are employed they are the destruction of roads, especially where the country is hilly, and where they are under the necessity of having the wheels locked, as in such cases the ground is in a manner ploughed up by them. The same objections are equally strong against large and heavy carts, as they produce the same bad effects, only in a somewhat less degree.

It is, in short, strongly contended that waggons cannot be advantageous to the farmer, since the same number of horses with single horse carts will draw much more than when yoked six or eight together. Besides, it is conceived that single horse carts are superior on other grounds; they are loaded and unloaded with greater ease and convenience, and are more handy for almost every purpose, and six or eight of them may be managed by a man and a boy at very little expense.

In these carts too, the size of the wheels can be adapted with the greatest exactness to the height of the horses, and be placed

with more convenience in regard to the centre of gravity of the load, by which the draught is considerably lessened.

In fact, the Cumberland farmers, and those of some other counties, are fully convinced that very great advantages are derived from using carts of the single horse kind. This sort of cart has lately been compared in many different points of view by an accurate observer, and found in almost every instance to be greatly superior to waggons or tumbrils for almost all the various purposes of the farm.

CAUSES OF THE DRY ROT, AND THE VARIOUS METHODS OF SEASONING TIMBER, CONSIDERED.

[Our readers are referred to the third number of our last volume, for an account of some experiments made under the direction of the Board of Agriculture, to test the efficacy of a new method of seasoning timber, proposed by Captain Layman, of the British navy. We have seen no further notice of it except what appeared in the Quarterly Review for October, 1814. From this article we learn that the invention of Captain Layman has received no countenance from the Admiralty and Navy Boards, and the author as little from the Reviewers. We have extracted from the Review of Captain Layman's *Exposé*, the following interesting article on the causes of the *dry rot*, and the means of preventing its ravages.]

It is an undoubted fact, that the duration of ships of war, and particularly those of the line, has of late years been very much shortened. They have died prematurely of a new disease—new, at least, with regard to them,—known by the name of the *dry-rot*, which we have supposed to originate in green timber, but which, having once planted itself, spreads its seeds and roots equally over green and dry, rotting and decomposing the fibre of the wood wherever it fixes itself.

The origin of this destructive disease is not, if our conjecture be right, difficult to be traced. We know not as yet precisely what is the supposed fluid matter called the *sap* of trees, nor by what laws it is propelled from the roots to the highest extremities: but that a circulation of something does take place has long been known and confirmed by direct experiment.

It is this circulation, moreover, as it would seem, that communicates new life to the vegetable principle; that creates in its ascent buds and leaves, flowers and fruit, all of which die away and disappear when it again descends. Whether it be the acids or the oils, the resins or the gums, or all or none of them, that are thus put in motion, or whether it be some gaseous or other subtle and volatile fluid, which at the proper season resuscitates the vegetable life, remains yet to be discovered. It is pretty clear however that whatever that power may be, which thus stirs up and calls into new life the active principle of vegetation, it does not cease altogether from the moment that the tree has been cut down and separated from the parent root. Every one knows that the trunks of elm trees, for instance, cut down in the spring of the year, if the bark be suffered to remain on them, will push out leaves and small shoots the following spring along the whole length of the trunk; the sap that was in the wood at the time of felling, impelled by the genial influence of the season, begins to circulate, puts the living principle in action, opens the pores of the wood, and makes a last and feeble effort at vegetation.

This simple fact, which could not escape common observation, must have led to the conclusion that winter felled timber, when the sap was supposed to have descended into the root or the ground, would not possess the same tendency to vegetate; and that if the bark was stripped off in the spring while the tree was standing, so that the sap could not rise, or rise but imperfectly, and left in that upright posture till the winter, the tendency to vegetation would be still further repressed; the fluid parts would subside; the fibres of the wood collapse; and the timber become more compact, solid, and strong; or, in other words, would at once be seasoned, and not liable to throw out those abortions of vegetation, those excrescences which form the lowest class of vegetables, and which, by some extraordinary process communicated to the wood, infect it with the disease above-mentioned; a disease which seems to act by depriving the wood of all moisture, and so completely decomposing the fibres, that, though in appearance sound, it crumbles between the fingers into a mass of impalpable powder.

We are fully aware that different opinions are entertained as to the origin of the dry rot, many contending that this disease

will as readily attack timber, however long it may have been seasoned, when exposed to damp and confined air, as it will seize upon green timber. We are not of this opinion; and we are borne out, as we think, in our theory of the dry-rot being produced originally by the natural juices of the wood being brought into action, from the circumstance of the different genera of *fungi*, which are found to infest different kinds of timber. Mr. Sowerby, who was employed by the Navy Board to examine the Queen Charlotte, a new ship in a complete state of dry-rot, found the most prevalent of the parasitical vegetables which occasions the disease, to be the *xylostroma giganteum*, a gigantic leather-like fungus peculiar to oak, and known therefore, in common language, by the name of *oak-leather;* but he found also the *boletus hybridus*, being the young state of the *boletus medullapanis*, or white, ragged, soft fungus and *auricularia pulverulenta*, and some others, among which the *boletus lachrymans* was the most scarce, although this last fungus is that which mostly infests houses and other buildings. Now, as the Queen Charlotte was injudiciously built of a mixture of English oak, and American oak, of English fir and American pitch-pine, this assemblage of different sorts of timber will, we think, account for the different kinds of fungi found in that ship. In general, however, the *xylostroma giganteum* may be considered as the cause of dry-rot in ships, and the *boletus lachrymans* in houses, the former being the parasite that feeds on oak, the latter on fir.

It may fairly be inferred then that as different timber produces different kinds of fungus, there must reside on each kind of timber its peculiar moisture, and that mere wetness or damp could not produce a different vegetable on dry well-seasoned oak and other kinds of timber when exposed to such damps. It has been hinted to us, that fungi may be the *effect*, and not the *cause*, of rotten timber; as the fungi which form the mould of cheese are the *consequence* of previous rottenness, and not the *occasion* of it. We *doubt* the correctness of the fact with regard to cheese, and are rather inclined to believe that, if a cheese in a perfect state of soundness, be placed in a close damp cellar, it will very soon be covered with fungi, and long before the least tendency to internal rottenness has taken place; and with regard to timber, we *know*, for we have *seen* that in the *Mulgrave*, the *Barham*, the *Poictiers*, the *Dublin*, the *Sterling Castle*,

cum multis aliis, whole planks, timbers and beams were covered with a sheet of fungus, while the wood was still perfectly sound; though it is still well known, that if not speedily removed, and a free circulation of air admitted, the *consequence* would be, a total decomposition of the fibres, either from some power possessed by the fungus of extracting the juices of the wood, or of occasioning some fermentative process within; and while the surface of the timber would still retain a smooth and sound appearance, the internal part would be reduced to a mass of dust and rottenness.

We have already had occasion to distinguish the *dry* from the *wet* rot; the latter has nothing to do with fungus, but is occasioned by alternate exposure to wet and dry; it is slow and gradual in its progress, and rather separates than decomposes the fibres of the wood.

Another circumstance may be mentioned in corroboration of our theory. The more *sappy* timber is, the more it is subject to be infected with fungi and the dry-rot; thus all the timber brought from the *forests* of Germany, of which the Antwerp fleet has been built, is remarkably subject to the dry-rot; so is all the timber that is brought from the *forests* of America; whereas the timber of trees that grow in exposed situations, as on the sides of hills and commons, and hedge-rows, being more compact, and less sappy, is less subject to this fatal disease. Soil and climate have also, no doubt, considerable influence on the nature of growing timber; the farther south oak grows, the better the timber would seem to be; the oak on the bold shores of the Adriatic is the best oak known in Europe; and the oak timber which is produced in the southern counties of England is preferred to the timber of the northern counties; that of Sussex being considered as the best. In a contract for tree-nails, drawn up more than a hundred years ago, it is stipulated that they should be made of ‘ good Sussex oak, free from knots and shakes.’

All these points are of great importance to be ascertained, and we know of no one so well qualified for the purpose as Mr. Sowerby, who has had more experience of the nature and habits of fungi, and of their ravages wherever they fix themselves on timber, than any other person we have heard of; and his ideas we understand, with regard to the seasoning of timber, accord

very much with those of the officers of his Majesty's dock-yards, who have attended to this most important subject.

There can be little doubt that the custom of felling timber trees, except the oak, in winter, arose from a conviction that, when the sap has subsided, the timber is more compact. The exception of the oak from this general practice must have arisen entirely from the value of its bark and the facility of stripping it off for the purposes of tanning, while the sap is in the act of rising; and to this circumstance alone can be attributed the statute of the 2d James I. which prohibited the felling of oak trees when bark was at a given price, unless between the first day of April and the last day of June: with the exception however, of such oak timber as was meant to be employed in the building or repairing of houses, ships or mills—an exception which points out very clearly what the opinions were of our ancestors with regard to the superior quality of winter-felled timber. This opinion has, in fact, been confirmed by the ingenious experiments of Mr. Knight, who ascertained that the alburnum or sapwood of trees felled in the winter is more firm and tenacious in its texture, and consequently more durable, than that of the same kind of wood which had been felled in the spring.

Doctor Plott, who wrote about 130 years ago, mentions a practice in Staffordshire of stripping the bark of their oak trees about May, while standing, and when the sap was beginning to flow, and of felling them about Michaelmas. In Mr. Evelyn's book are some papers on this subject: and on the recommendation of Mr. Pepys, secretary of the Admiralty to James the Second, that monarch issued his royal warrant to the Commissioners of the Navy, directing them to cause to be stripped in the spring and felled in the ensuing winter, one hundred and fifty oak trees in Bushy park, fit for naval purposes. The result of the experiment is not known; though there is little doubt that, able and active, exact and laborious as Mr. Pepys was, the record would be found in his numerous manuscript volumes, now shut up in the Pepysian library at Cambridge, but which ought unquestionably to be lodged at the Admiralty, among the records of that department.

The papers of Pepys, of Plott, and Evelyn, induced the French naturalists, Buffon and Du Hamel, to undertake a set of experi-

ments on the barking of trees in the spring, and leaving them to stand during the summer to season; by which process Buffon pronounces the timber to acquire additional compactness, weight and strength, and consequently greater durability. And it is laid down (in the *Histoire Générale de la Marine*, published in 1758,) as a criterion to determine the quality of oak timber—that, to be good, it should be felled when the moon is at the full, and the wind north; and that it is sure to be bad, if cut at new moon, and when the wind blows from the south.*

In England, the subject has not met with that attention which it so evidently deserves. Dr. Plott says the Royal Sovereign was built of winter-felled timber, and speaks of its uncommon hardness; but there is no evidence of this fact. The first experiment we know of was that of building the Montagu of winter-felled timber, as we mentioned in a former Number, by order of Lord Sandwich; this ship was launched in 1779, and we do not find that she required any repair for ten years afterwards, and, indeed, she is yet a good ship.

It is the less surprising that the durable quality of this ship should not have attracted the attention which might be expected, when it is considered that the experiment was made when the ordinary duration of ships was calculated at eleven or twelve years, before they required much repair; but we own it does appear rather unaccountable that none of our builders, either public or private, should have felt the advantage of deviating from the ordinary routine, or that a mere spirit of curiosity should not have induced them to put to the test of experiment the comparative quality of oak timber felled in the winter when the sap was down, with that of the same age and from the same forest felled in the spring when the sap was rising. In France, where 'they order these things better,' they not only felled their oak trees when the 'wind was at north' and 'in the wane of the moon,' but by a royal ordinance of the year 1669, the time of felling was fixed from the first of October to the fifteenth of April. But Bonaparte, satisfied by the reports of the Sçavans, that 'ships built of timber felled at the moment of vegetation must be liable to rapid decay, and require immediate repairs from the effect of *the fermentation of the sap* in those pieces

* Hist, Gen. de la Mar. tom. iii. planche I. p. 282, de l'Archit. Nav.

which had not been felled at the proper season,' issued a circular order, 'à M M. les Agens Forestiers,' that the time for felling naval timber should be abridged, and that it should take place 'in the decrease of the moon, from the first of November to the fifteenth of March.'*

The late miserable failures in all the ships of the line launched from merchant's yards, to which recourse was had from the low state of the navy, and the inadequate means afforded by his Majesty's dock yards to raise it to its proper pitch, have revived the subject; and it is satisfactory to learn that the Commissioners of the Woods and Forests of the crown are instituting inquiries into this interesting question, and conducting experiments on an extended scale. It is high time, indeed, that a question so intimately connected with the vital interests of the country should be finally decided.

To destroy this vegetable principle in timber, which, as we have observed, is called into action long after the tree is cut down, a variety of experiments have been made on a small scale; but they have either not been applicable to large naval timber, or if applicable, have for the most part failed of success. They have consisted generally in the impregnation of the timber with oils, salts, acids, or in coating its surface with paint or lime, or bringing it to a state of seasoned timber by the application of heat, either by stoving it in close kilns, or by steaming or boiling it.

The application of oil was probably suggested from the known quality which this fluid possesses of killing living plants, as it does insects, by filling up the pores and excluding the circulation of air, or other fluids; or rather perhaps from an observation that ships employed on the whale fishery were never infected with the dry rot. The application of oil in a large way would, we conceive, be both expensive and inconvenient, and not improbably ineffectual; for as the question applies only to *green* timber, of which the vessels are already occupied by its natural juices, the absorption of oil could only take place in a partial degree.

The same objection would seem to apply to the steeping of timber in saline solutions, or the various kinds of acids, as we

* Instructions de l'Administration addresseés á M M. les Conservateurs, 6 Août, 1803. Circulaire du premier Février, 1811.

cannot see in what manner they could be made to impregnate the whole mass, unless the natural juices were previously driven off. Acids would, besides, very speedily corrode the whole of the metallic fastenings. But there is another and more weighty objection to such impregnation. The attraction for moisture which salts and acids possess, would keep the whole interior part of the ship dripping wet, like the bannister rail of a stair case on a moist day succeeding a frost, and not only destroy the ship with the *wet*-rot, but the ship's company also, whose health experience has proved to be best preserved by keeping the ship as dry as possible—the remedy in this case would be infinitely worse than the original disease.

As to coating over the surface of unseasoned timber with paint, washing it with a solution of lime, &c. little benefit, we apprehend, would be obtained from such a process. By excluding the free circulation of air, the vegetable process carrying on within the timber would be more likely to be encouraged than suppressed; and if it be true, as we have heard it asserted, that vessels carrying coals and lime are not subject to dry-rot, this exemption, we apprehend, ought to be ascribed rather to the frequent exposure to the air of the interior surface of the ship, and the absorption of moisture by the articles brought in contact with it, than from any particular virtue inherent in either coals or lime, by which the ship's timbers are supposed, erroneously we think, to be impregnated. It is the smallness of the timbers of which coasting vessels are constructed, and which renders a long seasoning unnecessary, aided by the thinness of the planking and the large open spaces between the timbers, through which the air can freely circulate, that preserves them from the dry-rot; from which they will be found equally free, whether they are employed to carry coals or lime, or cargoes composed of sundry articles.

Few persons, we believe, have given more attention to this important subject, or made more experiments on the rapid seasoning of green oak timber, than Mr. Lukin, though as far as we can learn, they have all ended in disappointment. He conceived that if the gallic acid and the watery particles were driven out of a piece of oak timber, by a process which should prevent the surface from splitting, the timber would contract its dimensions by the fibres being brought closer into contact,

lose much of its original weight, and gain additional strength. With this view he buried a log of green oak in pulverized charcoal, placed in a stove or oven. When the process was completed the log had a very promising appearance; the surface was close and compact, the log had considerably contracted its dimensions, and lost a great part of its weight; but when the saw was applied to divide it, the fibres within were found to have started from each other; and a plank cut from it exhibited a fine piece of net work, ramified and reticulated precisely like the inner bark of a tree;—in fact it was completely shaken in pieces, and of course utterly worthless.

Mr. Lukin, however, learned something from the failure of this experiment. He now conceived that if he could by any means contrive, in dissipating the aqueous or other fluid matter of the wood by heat, to supply its place with an oleaginous fluid, he should not only destroy the vital principle of vegetation, but keep the fibres together and accomplish the desired purpose. With this view he got permission to erect a huge oven or stove in Woolwich yard, capable of containing two or three hundred loads of timber: on the outside, at the two ends of the building, were erected two large stills or retorts, in which the dust of the pitch pine was submitted to distillation. From the heads of these stills ran iron pipes, perforated with holes like a cullender, which passing through the walls into the building, were continued along the upper part for the whole length. The stove or kiln was kept up to a certain degree of heat sufficient to cause the fluids of the timber to pass off by evaporation, but not so high as to rend the logs. The oily matter distilled from the saw dust, and resembling weak oil, or rather spirit of turpentine, in passing along the iron pipes dropped through the holes upon the wood beneath, and was immediately absorbed by it; and thus, it was conceived, filled up the vacant pores from which the aqueous matter had been expelled;—when the transfusion was supposed to be complete, it was intended to stop the process.

The idea was ingenious enough, though we doubt the efficacy of the experiment; before however the process was completed, an unfortunate explosion took place which killed six men, and wounded fourteen others, two of whom died afterwards of their wounds; three of the former and most of the others were struck at the distance of sixty feet from the seasoning house.

The explosion was like the shock of an earthquake; it threw down seventy two feet in length of the dock-yard wall of three bricks thick, a part of which was driven to the distance of 250 feet in an adjoining field; in the same field it threw down a house. An iron door, weighing 280 pounds, was thrown to the distance of 230 feet; another of the same weight, in its passage through the air, knocked down a chimney and fell at 190 feet distance; the bricks and sticks of the building were hurled in every direction to the distance of 300 feet. This melancholly accident was supposed to be owing to the flame making its way at the part where the flue entered the building, and set fire to the mixture of hydrogen and oxygen gases contained in it. It is hardly necessary to add that this fatal experiment has not been repeated.

Of all the methods which have been tried for the artificial seasoning of timber, none, we believe, will be found so effectual and in every way so little objectionable, as that of boiling in water or steam—the latter, perhaps may be considered as too penetrating and injurious to the fibre; but the former has long been practised, though with other views than that of preventing dry-rot; namely, to bend the piece more easily to the required curve: all the thick planking, for instance, near the bows of a ship, are first boiled in a stove before they are applied to the timbers. It has recently, however, been discovered, as we understand, that fungus will not grow on a piece of timber that has been so boiled. The experiment is easily made; take a green piece of wood, saw it into two pieces, and after boiling one of them for twenty-four hours, place both in a close warm cellar. The unboiled piece will, in a very short space of time, be covered over with a coat of fungus, and if the other remain untouched, the effect of boiling is decisive; and the rationale of the experiment is too obvious for us to dwell upon.

We are, however, decidedly of opinion, that nothing but *time* and a judicious arrangement of the timber stacks, such as will keep them as much as possible from wet, and suffer the air freely to circulate through them, will give an effectual seasoning to oak timber on a grand scale, so as to answer all the demands for that article which the British navy requires. Had all our ships of war been built of timber with a seasoning of three or four years, we should not have heard so much of the ravages

committed by the dry-rot, nor of so many ships being unfit to keep the sea after two or three years, and sometimes as many months, from the time of their launching. Ships of this kind are not likely, however, to be brought hereafter into the national navy. We have paid somewhat dear, it is true, for experience; but as 'bought wit' is said to be the 'best wit,' it is to be hoped that we shall profit from it; and, in that case, we may safely predict that a ship of the line never will henceforwards be launched in this kingdom from a merchant-builder's yard.

MANAGEMENT OF FRUIT TREES.

BY EBENEZER PREBLE, ESQ.

[To the Corresponding Secretary.]

Boston, January 22d, 1816.

SIR,

By a vote of the Trustees of the Massachusetts Society for promoting Agriculture, I observe, each member is requested to furnish some original article, or one selected, to be inserted in their next agricultural report. As no part of the horticulture of our country is more neglected, or less understood, than the management of fruit trees, I shall submit some remarks on that subject, for the consideration of the publishing committee; and describe the manner in which I have managed my own trees, with success. Although similar methods have for some years been practised in Europe, we have but few instances of this mode of culture in this section of the United States.

The apple and pear tree will, at this time, be the subject of my communication, as producing the most valuable fruit. They give food in various ways, and liquors superiour to any other we have. The general adoption of these would preclude the use of ardent spirits, which tend to impoverish the people, and injure their morals. Trees crowded with wood, and enveloped with suckers, are as unpleasant to the eye, as they are injurious to the quality and quantity of the fruit they produce. We frequently observe old trees, with holes in them, particularly the apple; they are caused by neglect, or injudicious pruning.

Limbs are frequently broken by the wind, and suffered to remain in that state until decayed—the farmer generally makes use of a hatchet or axe in pruning—limbs are cut at some distance from the body of the tree, and the stump not having aid from the sap, soon decays; which decay is facilitated by the rough surface caused by the instrument. It then serves to conduct water to the body, and there being no outlet for it, the tree decays, and is left with only a shell of wood and bark, and is then subject to be blown down by high winds.

The culture of trees has for some time engaged my attention, and has been my favourite pursuit. I have been averse from making a public communication on this, or any other subject; but the solicitations of my friends have induced me to make known the result of my experience, however inadequate I may feel to give general directions in this branch of culture.

I shall communicate the manner in which I have succeeded with more than one thousand of my own trees, and I presume their present condition will justify the mode I describe. I prefer the autumn to the spring for planting my trees. As soon as the foliage is off I remove them—the holes should be dug much larger than usual for their reception; the roots carefully pruned; the matted fibres cut off, as they would mould and decay, and prevent new ones from shooting—the long large roots should be shortened, to induce them to throw out new fibres; all broken and bruised parts should be removed. Care should be taken not to plant too deep—the roots should be extended, and spread in a horizontal direction—all top, or perpendicular ones, if not sufficiently elastic to conform to the others, should be cut off. It is preferable to raise the ground, and plant the tree high, rather than to suffer the root to shoot into the dead earth—deep planting retards the growth, and injures the fruit. Some well rotted manure mixed with top soil should be placed round the roots, the earth carefully pressed with the fingers, or a pointed stick, so that every vacancy may be filled, and that the earth may come in contact with all the fibres, without changing the position of the roots. If the ground is not moist, they should be watered at the time of planting. If they are set out in grass land, the ground can be made loose with an iron bar round the holes, a few inches from where the ground is broken; this will assist the roots when they extend.

The advantage of fall planting is, that the ground will settle round the roots previous to the frost setting in, and be prepared to shoot in the spring, aided by the rains which prevail at that season. In this case, few will be lost. If planted in the spring, the drought and heat of summer will injure, if not destroy them, before the roots find their place; the farmer also has more leisure in the autumn, and the ground is in a better state to receive them.

Staking trees to secure them, I do not approve; they are frequently chaffed, unless well guarded with matts. As a substitute, I raise the ground a few inches above the level, round the trees, to keep them steady, and protect them from frost, leaving it hollow in the centre, to retain the rain and preserve moisture. When the tree has taken root the earth can be removed to its original situation.

The most approved distance to plant an orchard of apple trees, is forty feet in every direction. A less distance would answer for pears. The land can then be improved for other agricultural purposes. In grass land the soil can be cultivated round the trees with potatoes.

In pruning, all suckers should be grubbed up about the roots, and cut from the body of the tree, and the wood so thinned as to admit the air freely to pass. Every branch should have room without coming in contact witheach other; this will prevent their chaffing; sufficient bearing wood will then remain, to produce more, and better fruit.

Many of the branches of young trees may be separated with crotched sticks, with matts to protect the bark. The head can be formed with strings, fastened to peices of refuse leather, from three to six inches long, as the size of the branch may require, and about one inch wide, with holes in the ends; the strings secured to the leather, may be extended to stakes driven into the ground, and the limbs brought down to a horizontal direction. In this position, more fruit will be produced, and the trees opened without mutilating them.

The only tools necessary for pruning are, a saw with the teeth set wide, a chisel, and knife. All large limbs should be cut close to the body of the tree, or to a strong leading shoot that will draw up the sap. Smaller branches should also be pruned to a bud, and if the wood is made a little concave, it will assist the

wound in closing. All large limbs should first be cut at a distance from where the limb is to be pruned, as the weight would be unmanageable, and apt, on its separation, to strip the bark. The under part of all branches should first be cut through the bark previous to its being pruned. After a limb has been cut by the saw, make the wood and edges of the bark smooth with some sharp instrument, and immediately cover the part with composition, to exclude the weather and keep insects from the wound.

I have found tar and ochre the best ingredients for a composition, they are not expensive, and are easily procured. Pounded brick sifted, and pulverized chalk, with tar, have been recommended; either of them would answer. Let the mixture be of the consistency of grafting clay, the wood and bark will remain bright under it, and will not obstruct the wound in closing.

The general impression is, that trees must be pruned at particular seasons of the year. I have pruned at all times of the year, without being partial to any, and with the aid of the composition, have been successful.

The injudicious method practised in gathering fruit, is more destructive in its consequences, than is generally understood; the blossom buds for the succeeding year are placed at the side of the foot stalk of the fruit, and if the spurs are broken, no fruit on that part will be produced the next season.

The general method of gathering apples for cider, is, shaking the tree, and thrashing the branches with poles, the former will answer when the fruit is at maturity; they will then drop without injury to the buds. Poles should never be used, but with a hook at the end covered with cloth, or matt, to prevent wounding the bark, they then serve to shake the small limbs. Particular attention is required in gathering winter fruit. They should be taken in the hand, the finger placed at the foot stalk and by bending it upwards the fruit is gathered with ease, and without injury; they should be removed from the gathering basket to the cask prepared for them with great care; if bruised they soon decay, the less they are moved the better. When in barrels they should be placed in a cool, dry, shaded situation above ground, and remain until they are in danger of being injured by frost, and then removed to the cellar.

REMARK ON THE SUPERIORITY OF COMPOSTS TO SIMPLE DUNGS.

[Transactions Caledonian Horticultural Society.]

A WRITER in a late Journal remarks, that all dung before being used as manure should be mixed with other substances, and a large heap formed, which should be turned over once or twice before being used. The common way of spreading dung over land, he observes, be it either arable or pasture, can by no means answer the end; for the fertilizing particles of dung being of a volatile nature, are readily exhausted by the action of the sun and air. The use of unmixed dung has been thought to be the best means of improving all lands. Most people think, if they have dung enough, all is well, and vegetation cannot fail of going on. This is especially the case in the repairing of worn out grounds. But with this we can by no means agree. Dung ought to be considered no more than a good ingredient to mix with earth and other sorts of compost.

ON THE IMPORTANCE OF ROTATION OF CROPS IN GARDEN GROUND.

[Transactions Caledonian Horticultural Society.]

GARDEN ground in general, being successively cropped with vegetables very near akin in nature to each other, and from the frequent application of manure, soon becomes a receptacle for worms, maggots, and other vermin, which prove destructive to the roots of carrots, onions, cauliflowers, and other tender vegetables, from which they are always free in new soils, or ground that has never been cropped before with such vegetables. The garden ground at *Errol* has been occupied as a garden for upwards of a century, and consequently is subject, in common with other old gardens, to the attacks of several species of vermin. This first induced me to try to remove this evil by a *rotation of crop-*

ping; and the most rational method that presented itself was, to follow strawberries that had been four or five years planted, with onions; and artichokes that had stood the same time, with carrots; for the caterpillars do not choose to attack either the onion or carrot. This plan I found to succeed, and I have now practised it with uniform success for nine years.

Cauliflower and brocoli roots may be preserved from the effects of worms by watering the drills well with soap-suds before planting, and occasionally afterwards; this not only prevents the worm, but encourages the growth of the plants, and in some measure prepares the ground for other vegetables subject to the same sort of attack.

IMPORTANT COMMUNICATION RELATIVE TO THE CANKER WORM.

BY W. D. PECK, ESQ.

[To the Corresponding Secretary.]

DEAR SIR, *Cambridge, 20th January,* 1816.

In the Centinel of the 25th November last is a notice of the autumnal rising of the canker worms, or rather of the moths or millers which produce them.

It is there stated that this appearance of the insect late in the fall is not generally known. That it is not generally known is much to be regretted; for if the eggs are deposited in the fall, tarring the trees in the spring is in a great measure useless, and the farmer, finding his labour unavailing, will lose his good opinion of the most effectual remedy which has hitherto been put in practice.

It is certainly true that the canker moths rise in the autumn and deposit their eggs. They are such as were an inch or two below the surface; those which lie deeper are not affected by the transient changes of the atmosphere in November, and do not rise till the spring.

The history of this insect, published by the Trustees of the Massachusetts Agricultural Society in 1796, though not absolutely perfect, contains all the most important particulars which are necessary to be known by the agriculturalists. At page 41

of the pamphlet which contains it, is the following paragraph. "The chrysalis state comes on in twenty-four hours after the larva has penetrated the earth, and it appears that the insects are soon perfect, since a course of warm weather has been found to raise some of them from the earth in the month of November."

Those which rise in November are not very numerous, compared with those that rise in the spring; but being very prolific are exceedingly injurious if no means are taken to prevent their ascending the trees; as the winter's frost does not kill the eggs.

The warmth of the season at the time of their descent into the soil is favourable to the perfect development of the insects in the chrysalis, particularly those which are nearest the surface, while those at the depth of six or seven inches are longer in coming to maturity. The first are perfect in September, and require only to be excited, to burst from their confinement; but they cannot be excited till they have passed through a degree of cold sufficient to render them sensible of the mild temperature of the atmosphere which occurs in November. The excitability of such as lie deeper, and are not accessible by cold till a later period of the season, is not so soon accumulated, nor are they sensible of slight changes of temperature which affect only the surface; they therefore do not leave the earth till the spring, when the warmth of the air is longer continued and penetrates to the depth at which they lie.

On the 22d November, I was examining a twig upon which a female moth had just completed her deposit, immediately above a leaf-bud; there were ninety-nine eggs. It was a twig of the sycamore maple, (*~~hus pseudo~~-platanus*) and will accompany this letter, with one of the English ash, (*fraxinus excelsior*) on which I have since found the eggs of the canker moth.

I do not know whether elms or other forest trees are infested with these insects *remote from orchards*. They abound in the vicinity of neglected apple trees, and the fact of their being found on the maple and ash, which indeed surprised me, as well as the elm, shews them to be multivorous, or at least adapted to feed on a variety of trees, and this perhaps they do to a greater extent than has been suspected. A check to their ravages, or their extirpation, is therefore more earnestly to be desired.

The remedy of tarring was probably first suggested by the structure of the female insect, which, happily for man, has no

wings. If this remedy were diligently and universally used, it would very likely rid us of this pest, it must indeed be granted, at a considerable expense. But the negligence of many will countervail the vigilance of a few, whatever remedy may be proposed or discovered.

The tar-bucket and brush are rather out of place in a farmer's establishment, and this may have had some influence in preventing the general adoption of the practice of tarring; but there are particulars in the œconomy of the Canker-worms, which indicate a process, that may very considerably check their increase.

There are many insects of the tribe to which this belongs, which go through their metamorphosis in a slight coccoon attached above ground to the plant they feed on; but many others, like the canker-worm, require to be kept moist, in the chrysalis state: these go into the earth, in which they are kept in a state of pretty equal moisture, by the humidity of the soil. If exposed to the action of the air, which would dry them, they would perish.

While they are caterpillars, they are in their strongest state. Their muscles are much more powerful, the head covered with a hard shell, and the six feet nearest the head, short and robust. They are thus enabled to dig their way into the soil, and the path, if I may so call it, which they make in their descent, remains open, or nearly so, and affords a passage for the ascent of the perfect insect, which, as respects muscular power, is in the weakest state of its existence.

These particulars suggest two operations, either of which alone would be beneficial; but united, almost effectual.

1*st*. Turning up the ground carefully in October, as far as the branches of a tree extend, to half a spades depth or five inches, so as completely to invert the surface. A great number of chrysalids would thus be exposed to the air and sun, and of course destroyed.

2*d*. Breaking the clods and smoothing the surface with a rake and passing a heavy roller over it, so as to make it very hard and without cracks.

By these two operations every vestige of their downward path would be completely obliterated, and if any remained undisturbed below the stratum of earth which has been turned up, they must

remain there, as it is utterly impossible for them to force their way in the moth or miller state, though such an obstruction as this layer of earth would oppose to them.

In grass grounds the sods should be turned with the grass side down, and placed side by side, so as to be rolled; the earth from which they were taken should be loosened and rolled also.

It is probable that with this treatment no moths would rise in the fall. The winter's frosts would heave and crack the smooth surface, but it might be smoothed and hardened by the roller or other means, in March, with much less trouble, time and expense, than the long course of tarring requires.

As lime when slacked is reduced to an impalpable powder, and is thus well adapted to close the least openings in the surface to which it may be washed by rains, I am inclined to think its good effects are produced in this way, as well as by its caustic quality.

I present you these hints, sir, but have no experiments in point to relate.

I intend to try this practice the next year, though I am not favourably situated for the purpose; as there are in this vicinity numerous apple trees which are totally neglected.

APPLE TREES.

[European Magazine,—1815.]

It is a general complaint, that the finest apple trees of this country have degenerated, and that many of the best sorts have entirely disappeared from our gardens and orchards. It would not be difficult to show that every successive grafting deteriorates the fruit engrafted; or to point out an effectual method of retaining good apples in this country without the trouble of grafting, as in every perfectly ripe apple there will be found one and sometimes two round seeds; the others will have one or more flatted sides. The round ones will produce the improved fruit from which they are taken, and those with flatted sides will produce the fruit of the crab upon which the graft was inserted. It requires not a long time to ascertain the difference; for if a circle is drawn in rich ground, and the flat-sided seeds planted therein, and the round seeds in the centre, the variation of quality

will be discovered in two or three years. The first will throw out the leaves of a crab, and the latter the leaves of an improved tree, distinguished in shape and fibre, and with a woolly appearance; and in due time the fruit of each will put every thing beyond doubt. It is to be observed that the seeds of crabs (being originals) are mostly if not altogether *round*.

HOTCHKISS' STRAW CUTTER.

THE machine for cutting straw and corn-stalks, invented by Mr. Elihu Hotchkiss, of Brattleborough, Vermont, is recommended to the public by the Trustees as the *best* and *cheapest* machine for the purpose, known in this country. The Society's premium of *seventy-five dollars* has been paid to the inventor, and to aid in introducing it into general use, the Society has purchased the patent right for the state of Massachusetts. The only further concern which the Trustees think incumbent on them is, to ascertain what should be a fair price for the machine; to prevent, as far as may be in their power, the cost of the machine being an obstacle to its use. The machine forwarded to the Board by Mr. Hotchkiss, was valued by him at twenty-five dollars, the patent right included. A machine of the same dimensions made in Boston, would cost not less than thirty dollars, nor exceeding thirty-five dollars.

It is desirable that the expense should not be so great as that any present inconvenience shall be felt in meeting it; as from this cause we become insensible and indifferent, often, to the benefits of valuable improvements, and their general adoption is thereby retarded or altogether prevented. We could name a number of instances in which labour saving machines, for farming purposes, have been confined to a few large farms, although as well adapted for use on farms generally, and attended with much real saving. In such cases the only apparent cause has been the expense of the first cost of the machine; and yet the diminution of labour in the employment of such a machine, would have amounted in many instances to as much, in one year, as the machine cost. The Trustees can do no more than *recommend* improvements. The rewards they bestow on useful inventions are designed, not so much to reward the successful

ingenuity of the inventor, as to simplify the operations of husbandry and enable the farmer to accomplish his work with less labour, and thus increase the sum of his profits.

Reference to the Engraving of Mr. E. Hotchkiss' Straw Cutter.

[See plate.]

THE length of the frame as seen at *Fig.* 1, is *four* feet. The frame is denoted by the letters A, A, A, A. The front posts as seen as *Fig.* 2, and which support the iron crank, E, are *four* feet high. Short posts at the opposite corners as seen in *Fig.* 1, *two* feet *eight* inches.

Distance between the side rails in the frame *eleven and an half* inches.

The trough B, *Fig.* 1, which contains the straw to be cut, is *five* feet in length, and breadth *one* foot *three* inches.

C, C, *Fig.* 4, Cog wheels attached to the cylinders L, L, as seen *Fig.* 1. Cog wheels *eight* inches diameter including teeth—teeth *two* inches in length.

D, *Fig.* 1, Wheel by which the motion is communicated to the cylinders—*two* feet diameter.

E, Iron crank as seen *Fig.* 2 and 5.

F, *Fig.* 2, Large wheel *three* feet diameter, with a handle fixed into one of the spokes for the purpose of turning by hand.

G, *Fig.* 2 and 6, The arm by which the slide containing the moveable knife is set in motion.

H, *Fig.* 2 and 3, Slide, with the principal knife attached diagonally. Length of this frame *two* feet; width, *one* foot *five* inches.

I, Principal knife with two edges, upper and lower, *seventeen* inches long and *two* inches wide.

J, *Fig.* 2, Ends of the straw in the trough, appearing from between the cylinders.

K, K, *Fig.* 2, The two set knives *one and an half* inch in breadth. Distance between the knives *two* inches.

L, L, *Fig.* 2 and 3, Cylinders, *five and an half* inches diameter. These by their motion draw on the straw from the trough, presenting it to the knives.

M, at *Fig.* 1, Is a wooden spring, the use of which is to compress the cylinders, resting against the axle of the inner one.

N, at *Fig.* 2, Cleats with rabbets corresponding to rabbets in the frame posts, within which the knife-slide plays.

Fig. 3.

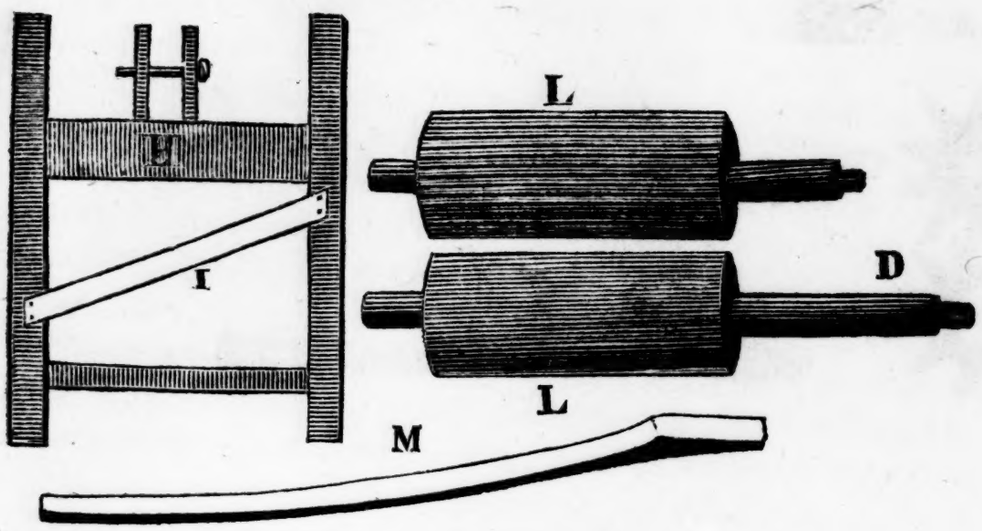


Fig. 5.

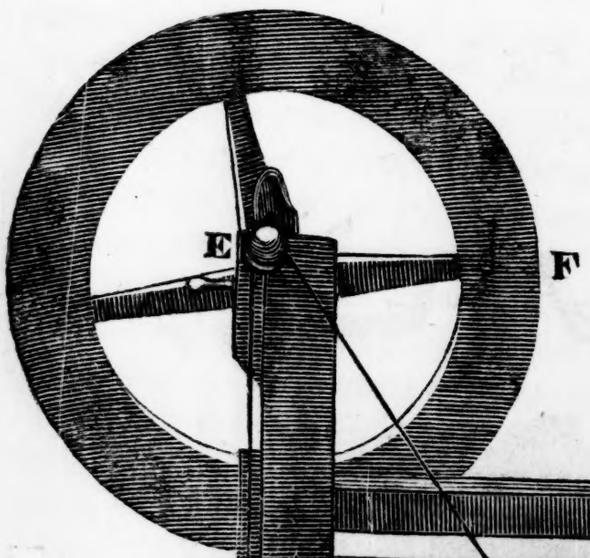


Fig. 1.

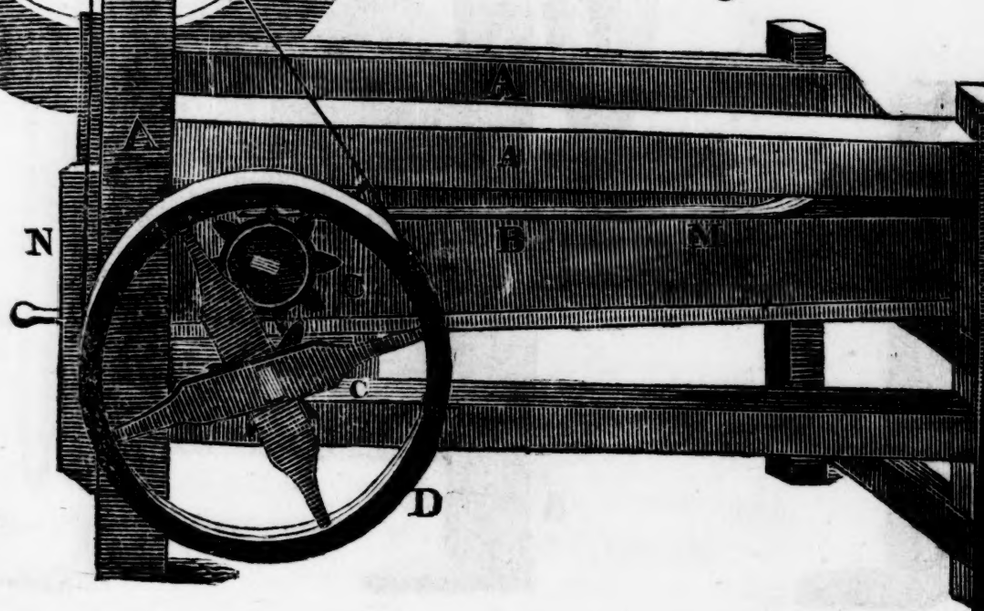


Fig. 4.

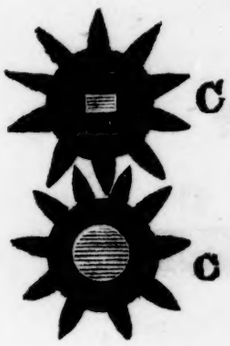


Fig. 6.

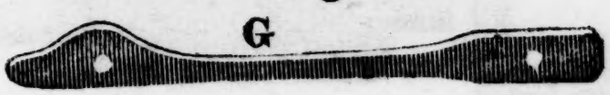
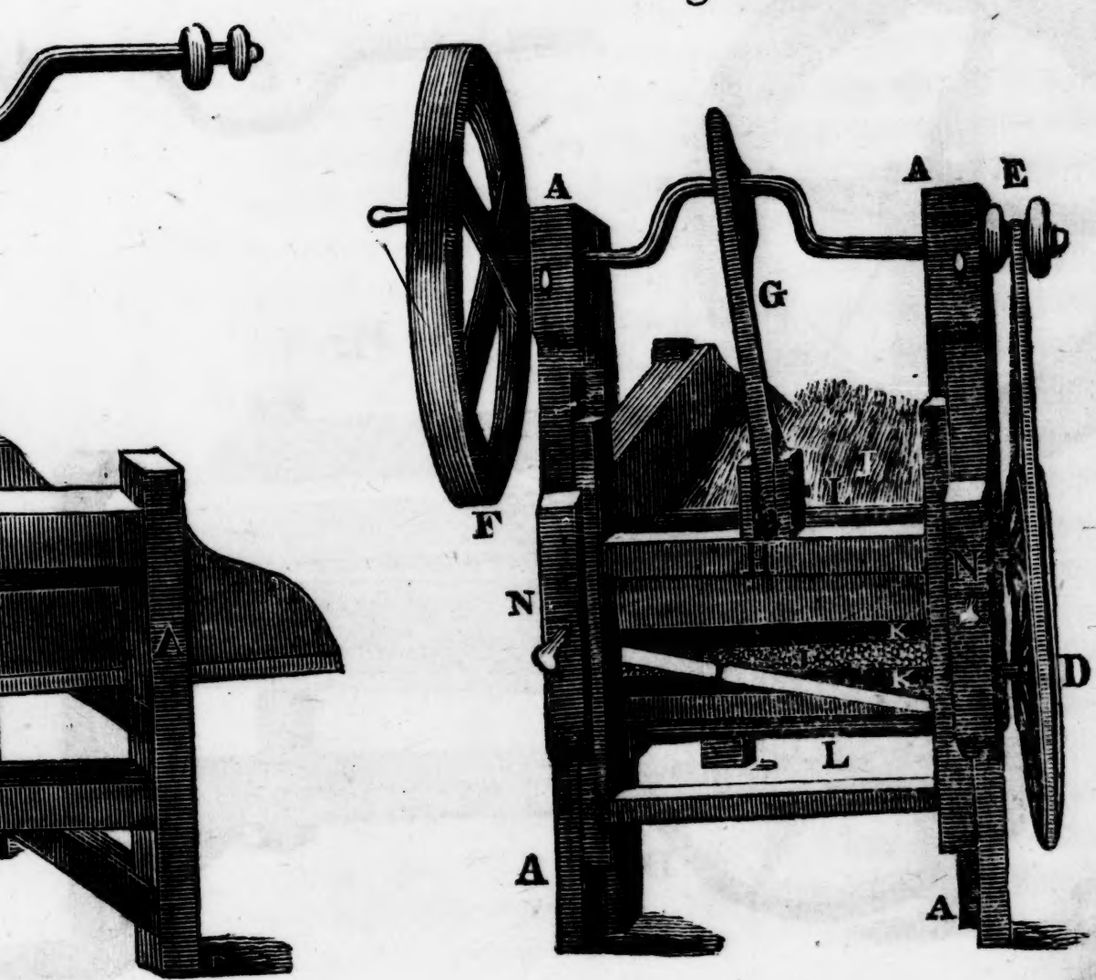


Fig. 2.



REMARKS FROM "MALTHUS ON POPULATION."

It is for those who are at the head of society to dertermine by their influence and example, whether a country shall go on in its natural course of progression in plenty and prosperity,(for its numbers will increase in proportion to the means of subsistence,) or whether by neglecting its natural resources, that course shall be checked.

If the population of a country outrun its means of raising or acquiring subsistence, it must unavoidably be checked by scarcity or emigration: for such is the inevitable law of nature to level the population with the food of the world.

Other circumstances being the same, it may be affirmed that countries are populous according to the quantity of human food which they produce or can acquire; and happy according to the liberality with which this food is divided; which is measured by the quantity which a days labour will produce.

As the strength of countries depend in a great degree upon their numbers and population, and consequently upon the degree of improvement and most perfect cultivation of the soil, it is therefore both the interest and duty of those who have the power, to use every means of promoting such improvement, thereby increasing the strength and security of their country.

But those who by their situation are exempt from bodily labour, have duties equally pressing and serious to perform; some must think and others act; the class immediately above the labourer must find capital or form plans, and inspect and assist in their execution; and they have it in their power by example, authority and influence to introduce and give effect to plans for increasing the subsistence and consequent numbers in a community, to better the condition of the lower classes of society, increase the general and individual happiness, and to add to the resources importance, strength and security of a State.

MISCELLANY.

Composition of an Unchangeable Cement.

BY M. THENARD.

[Repertory of Arts, &c. London, 1815.]

THE following cement has been used with great success in covering terraces, flat roofs, lining basins, soldering stones, &c. and it every where resists the filtration of water; it is so hard that it scratches.

It is formed of *ninety-three* parts of well burnt brick or clay, and *seven* parts of litharge and of linseed oil. Nothing can be more simple than its composition, or the manner of using it. The brick and litharge are pulverized, the latter must always be reduced to a very fine powder; they are mixed together, and enough linseed oil added to the mixture, to give it the consistence of thin plaster. It is then applied in the manner of plaster, the body that is to be covered being always previously wetted with a sponge. This precaution is indispensable, otherwise the oil would filter through the body, and prevent the mastic from acquiring the desirable degree of hardness. When it is extended over a large surface it sometimes happens to have flaws in it, which must be filled up with a fresh quantity of the cement. In three or four days it becomes firm.

Method of Preserving Fruit.

AN English Journal recommends the use of dry pit sand, for preserving pears and apples. Glazed earthen jars are to be provided, and the sand is to be thoroughly dried. A layer of sand an inch thick is then placed in the bottom of the jar; above this a layer of fruit, to be covered with a layer of sand an inch thick; then lay a second stratum of fruit, covering again with an inch of sand. An inch and an half of sand may be placed over the uppermost row of fruit. The jar is now to be closed and placed in a dry airy situation, as cool as possible, but entirely free from frost.

Clay Paint to destroy Insects, &c.

A CORRESPONDENT of the Caledonian Horticultural Society recommends *clay paint* for the destruction of insects and the mildew on fruit trees. The instructions are, that you take a quantity of the most tenacious brown clay that can be obtained; diffuse it among as much soft water, as will bring it to the consistence of thick cream or paint; pass it through a fine sieve or hair-search, so that it may be made perfectly smooth and unctuous, and free from any gritty particles. With a painter's brush dipped in the clay paint go carefully over the whole tree, the young shoots not excepted. This layer when it becomes dry, forms a hard crust, which, enveloping the insects closely, completely destroys them, without doing the smallest injury either to the bark or buds.

I have for several years past applied the clay paint to the buds of my grape vines. The advantage to them seems to arise from the clay retaining the moisture upon the shoots and buds for a greater length of time, when watered with the syringe, by which the buds are always kept in a kindly state of moisture.

From the simplicity of the above method, I doubt not there are many who may not think very highly of it; but all I request is, that a fair trial may be given to it. I have had the pleasure of seeing it very generally adopted in my neighbourhood by gardeners, who ridiculed it at first.

The syringe I use has brass noses fitted to the end, with holes of different degrees of fineness, so that water may be thrown in large streams or as fine as dew.

ANNUAL CATTLE SHOW,

AT BRIGHTON, IN THE COUNTY OF MIDDLESEX.

THE Trustees of the Massachusetts Society for promoting Agriculture, taking into consideration the importance of improving the breed of domestic animals, and influenced by the example of enlightened societies in all parts of Europe, who have established annual exhibitions of such animals, and encouraged the cultivators to produce them by suitable rewards, and wishing as far as possible to fulfil the expectations of the Legislature of this Commonwealth who have liberally patronized this institution, have determined to establish an *Annual Show of Cattle* in a situation, and at a season of the year, the most convenient for the citizens at large.

They have therefore adopted the following regulations, of which the Farmers throughout this State will please to take notice ; and in order to save trouble to the Trustees and themselves, they will conform thereto, whenever they may see fit to become competitors for the prizes.

I. The annual show of cattle patronized by this society shall take place at Brighton, on the second Tuesday in October in every year, the first to be exhibited on the second Tuesday of October 1816.

II. In order to assure to the competitors the most perfect fairness in the distribution of the Premiums, the Trustees will nominate three judges from among their own members, and two other gentlemen well skilled in such subjects to be joined with them ; the decision of a major part of whom shall be final and the premiums shall be paid accordingly.

III. The Premium shall be divided into two classes, with respect to each description of animals, in order to encourage those who, having failed to attain the first premium, may yet be entitled to some reward for their exertions.

IV. The object or animals for which premiums shall be awarded, and the rates of such premiums, shall be as follows, viz.

1. To the person who shall produce the finest Ox fitted for slaughter, of not less than thirteen hundred pounds weight, *forty dollars*, or a *silver cup* of equal value, at his option, which cup shall be ornamented with a suitable inscription.

2. To the person who shall produce the next best Ox fitted for slaughter, *twenty dollars*, or a *silver cup* of like value.

3. To the person who shall produce the best pair of working Oxen, *forty dollars*, or a *silver cup* of equal value.

4. To the person who shall produce the next best pair of working Oxen, *twenty dollars*, or a *cup* of equal value.

5. To the person who shall produce the best Bull, having regard to his size, form and other qualities, *thirty dollars*, or a *silver cup* of equal value.

6. To the person who shall produce the next best Bull, having regard as aforesaid, *twenty dollars*, or a *silver cup* of equal value.

7. To the person who shall produce the best Milch Cow, with the requisite proofs of her goodness as to quantity and quality of milk, *twenty dollars*, or a *silver cup* of equal value.

8. To the person who shall produce the next best Milch Cow, *fifteen dollars*, or a *silver cup* of equal value.

9. To the person who shall produce the best Merino Sheep, not less than five in number, whether rams or ewes, having regard to their forms and fleeces, *forty dollars*, or a *silver cup* of equal value.

10. To the person who shall produce the next best Merino Sheep, being at least five, *twenty dollars*, or a *silver cup* of equal value.

11. To the person who shall produce the best native Sheep, whether rams or ewes, being at least five, having regard to their size, form, quantity and quality of fleece, *ten dollars*, or a *silver cup* of equal value.

L. of C.

12. To the person who shall produce the best Swine, not less than *two*, and not less than one year old, *ten dollars* or a *silver cup* of equal value.

13. To the person who shall produce the next best Swine, not less than *two*, and not less than one year old, *five dollars*, or a *silver cup* of equal value.

V. The said premiums shall be adjudged on the day of meeting and shall be paid within ten days after the meeting, or sooner if convenient, and if the party shall elect to receive money.

In case any of the Trustees shall be competitors, one of the Trustees being a member of the Board shall be replaced by a person not a member of the Board, so that in such case the judges not being members of the Board shall constitute a majority.

The Farmers, it is hoped, will view this attempt to improve the breed of our domestic animals with favour, and as an additional and much stronger inducement to enter into the competition; they will of course reflect, that this *Cattle Show* will draw together a great collection of persons and thus will much facilitate the sale of their cattle, and also that the animals, which shall command the prizes, will sell at very much enhanced prices, either for Boston market, or to Connoisseurs who may be desirous of improving their own breed.

AARON DEXTER, *President.*

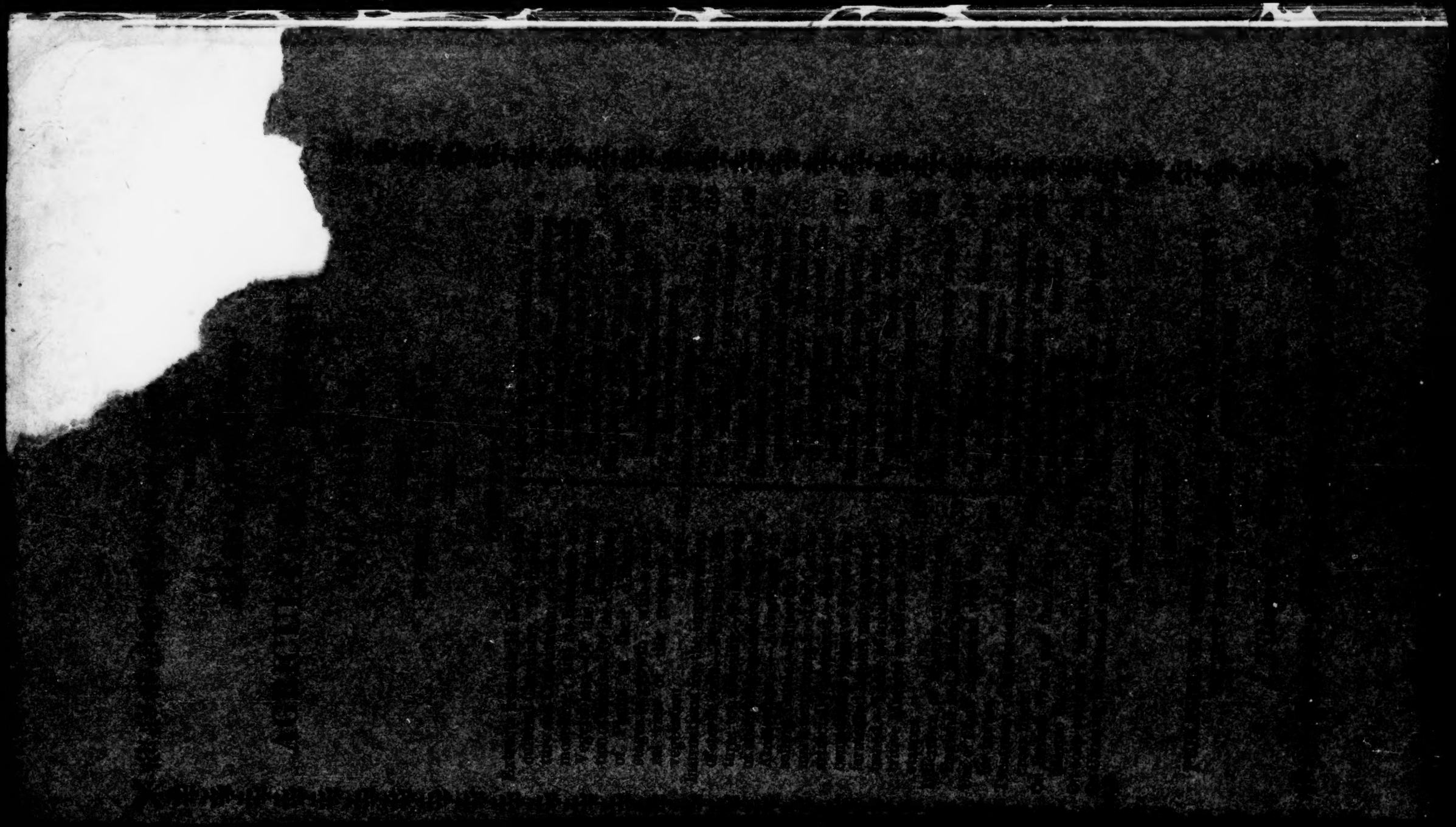
PREMIUMS

Offered by the Trustees of the Massachusetts Society for Promoting Agriculture.

1. To the person who shall have raised within two years from the first day of June, 1814, the greatest quantity of woad within this Commonwealth, not less however than three hundred pounds, and shall produce to this Board specimens of the same, provided the quality thereof be good, a premium of *one hundred dollars.*

2. To the person who shall within three years from the first day of June, 1814, produce a specimen of madder of good quality of his own growth, and who shall have actually raised the greatest quantity thereof, in this Commonwealth, being not less than 1000 pounds, a premium of *one hundred dollars.*

3. To the person who shall invent the most approved machine for thrashing or separating grain, (regard being had to its fitness for a medium farm,) a premium of *one hundred dollars;* to be claimed on or before the first day of June, 1816.

It is requested that the communications, for which the foregoing premiums are offered, be accompanied with proper certificates from the selectmen, magistrates, or clergymen of the vicinity, or other vouchers, to the satisfaction of the Trustees; that they be delivered without names, or any intimation to whom they belong; and that they be severally marked in such manner as each claimant shall think fit; the claimant sending also a paper, sealed up, having on the outside a corresponding mark, and on the inside his name and address.

RICHARD SULLIVAN, *Recording Secretary.*